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                  predefined hit display formats
 NEWS  4  APR 28  EMBASE Controlled Term thesaurus enhanced
 NEWS  5  APR 28  IMSRESEARCH reloaded with enhancements
 NEWS  6  MAY 30  INPAFAMDB now available on STN for patent family
                  searching
 NEWS  7  MAY 30  DGENE, PCTGEN, and USGENE enhanced with new homology
                  sequence search option
 NEWS  8  JUN 06  EPFULL enhanced with 260,000 English abstracts
 NEWS  9  JUN 06  KOREAPAT updated with 41,000 documents
 NEWS 10  JUN 13  USPATFULL and USPAT2 updated with 11-character
                  patent numbers for U.S. applications
 NEWS 11  JUN 19  CAS REGISTRY includes selected substances from
                  web-based collections
 NEWS 12  JUN 25  CA/CAplus and USPAT databases updated with IPC
                  reclassification data
 NEWS 13  JUN 30  AEROSPACE enhanced with more than 1 million U.S.
                  patent records
 NEWS 14  JUN 30  EMBASE, EMBAL, and LEMBASE updated with additional
                  options to display authors and affiliated
                  organizations
 NEWS 15  JUN 30  STN on the Web enhanced with new STN AnaVist
                  Assistant and BLAST plug-in
 NEWS 16  JUN 30  STN AnaVist enhanced with database content from EPFULL
 NEWS 17  JUL 28  CA/CAplus patent coverage enhanced
 NEWS 18  JUL 28  EPFULL enhanced with additional legal status
                  information from the epoline Register
 NEWS 19  JUL 28  IFICDB, IFIPAT, and IFIUDB reloaded with enhancements
 NEWS 20  JUL 28  STN Viewer performance improved
 NEWS 21  AUG 01  INPADOCDB and INPAFAMDB coverage enhanced
 NEWS 22  AUG 13  CA/CAplus enhanced with printed Chemical Abstracts
                  page images from 1967-1998
 NEWS 23  AUG 15  CAOLD to be discontinued on December 31, 2008
 NEWS 24  AUG 15  CAplus currency for Korean patents enhanced
 NEWS 25  AUG 25  CA/CAplus, CASREACT, and IFI and USPAT databases
                  enhanced for more flexible patent number searching
 NEWS 26  AUG 27  CAS definition of basic patents expanded to ensure
                  comprehensive access to substance and sequence
                  information

 NEWS EXPRESS JUNE 27 08 CURRENT WINDOWS VERSION IS V8.3,
              AND CURRENT DISCOVER FILE IS DATED 23 JUNE 2008.

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FILE LAST UPDATED: 3 Sep 2008  (20080903/ED)

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=> e us20070187638/pn
E1           1     US20070187636/PN
E2           1     US20070187637/PN
E3           1 --> US20070187638/PN
E4           2     US20070187639/PN
E5           1     US20070187640/PN
E6           1     US20070187641/PN
E7           1     US20070187642/PN
E8           1     US20070187643/PN
E9           1     US20070187644/PN
E10          1     US20070187645/PN
E11          1     US20070187646/PN
E12          1     US20070187647/PN
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=> s e3;d all
L1           1 US20070187638/PN



L1   ANSWER 1 OF 1  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2005:258664  CAPLUS
DN   142:299850
ED   Entered STN:  25 Mar 2005
TI   Composition based on hydrofluorocarbons and its use in refrigeration
     and/or air conditioning, and heat transfer system containing it
IN   Guilpain, Gerard; Caron, Laurent
PA   Arkema, Fr.
SO   Fr. Demande, 13 pp.
     CODEN: FRXXBL
DT   Patent
LA   French
IC   ICM  C09K005-04
CC   45-5 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   FR 2860001           A1    20050325    FR 2003-11025          20030919
     FR 2860001           B1    20080215
     WO 2005028586        A2    20050331    WO 2004-FR2231         20040902
     WO 2005028586        A3    20050630
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH,
             CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD,
             GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
             LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI,
             NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY,
             TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
         RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM,
             AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK,
             EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE,
             SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE,
             SN, TD, TG
     EP 1664234           A2    20060607    EP 2004-787286         20040902
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK
     CN 1852963           A     20061025    CN 2004-80027155       20040902
     JP 2007505963        T     20070315    JP 2006-526657         20040902
     US 20070187638       A1    20070816    US 2006-570938         20061222 <--
PRAI FR 2003-11025        A     20030919
     WO 2004-FR2231       W     20040902
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 FR 2860001      ICM    C09K005-04
                 IPCI   C09K0005-00 [I,C]; C09K0005-04 [I,A]
                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]
                 ECLA   C09K005/04B4B
 WO 2005028586   IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
                 ECLA   C09K005/04B4B
 EP 1664234      IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
                 ECLA   C09K005/04B4B
 CN 1852963      IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,C*]
                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]
                 ECLA   C09K005/04B4B
 JP 2007505963   IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,C*]; F25B0001-00
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                      [I,A]
                IPCR  C09K0005-00 [I,C]; C09K0005-04 [I,A]; F25B0001-00
                      [I,C]; F25B0001-00 [I,A]
 US 20070187638 IPCI  C09K0005-04 [I,A]; C09K0005-00 [I,C*]
                NCL   252/067.000
AB   The composition comprises R-32 (difluoromethane) 1-50, R-125
     (pentafluoroethane) 10-90, R-134a (1,1,1,2-tetrafluoroethane) 1-50, and
     R-143a (1,1,1-trifluoroethane) 5-20%.
ST   refrigeration air conditioning hydrofluorocarbon compn; heat transfer
     system hydrofluorocarbon compn; difluoromethane pentafluoroethane
     tetrafluoroethane trifluoroethane refrigeration compn
IT   Air conditioning
     Heat exchangers
     Refrigerants
     Refrigerating apparatus
     Refrigeration
        (composition based on hydrofluorocarbons and its use in refrigeration and/or
        air conditioning, and heat transfer system containing it)
IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro; composition based on hydrofluorocarbons and its use in
        refrigeration and/or air conditioning, and heat transfer system containing
        it)
IT   75-10-5, R-32   354-33-6, R-125   420-46-2, R-143a   811-97-2, R-134a
     RL: TEM (Technical or engineered material use); USES (Uses)
        (composition based on hydrofluorocarbons and its use in refrigeration and/or
        air conditioning, and heat transfer system containing it)
IT   74-98-6, Propane, uses   75-00-3, Ethyl chloride   75-28-5, Isobutane
     106-97-8, Butane, uses   115-07-1, Propylene, uses   115-10-6, Dimethyl
     ether   124-38-9, Carbon dioxide, uses   156-60-5, trans-1,2-
     Dichloroethylene
     RL: NUU (Other use, unclassified); USES (Uses)
        (rinsing solution; composition based on hydrofluorocarbons and its use in
        refrigeration and/or air conditioning, and heat transfer system containing
        it)
RE.CNT  7     THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Allied Signal Inc; WO 9411459 A 1994 CAPLUS
(2) Anon; PATENT ABSTRACTS OF JAPAN 1996, V1996(08)
(3) Asahi Glass Co Ltd; JP 08100170 A 1996 CAPLUS
(4) Asahi Glass Co Ltd; JP 8100170 A 1996
(5) Bkt Bonnet Kaeltetechnik Gmbh; EP 1072850 A 2001
(6) Daikin Ind Ltd; EP 0979855 A 2000 CAPLUS
(7) Ici Plc; EP 0536940 A 1993 CAPLUS


=> 75-10-5 and 354-33-6 and 420-46-2 and 811-97-2
75-10-5 IS NOT A RECOGNIZED COMMAND
The previous command name entered was not recognized by the system.
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=> s 75-10-5 and 354-33-6 and 420-46-2 and 811-97-2
   REG1stRY INITIATED
Substance data SEARCH and crossover from CAS REGISTRY in progress...
Use DISPLAY HITSTR (or FHITSTR) to directly view retrieved structures.
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L3        5875 L2

   REG1stRY INITIATED
Substance data SEARCH and crossover from CAS REGISTRY in progress...
Use DISPLAY HITSTR (or FHITSTR) to directly view retrieved structures.

L5        1615 L4

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Substance data SEARCH and crossover from CAS REGISTRY in progress...
Use DISPLAY HITSTR (or FHITSTR) to directly view retrieved structures.

L7        2281 L6

   REG1stRY INITIATED
Substance data SEARCH and crossover from CAS REGISTRY in progress...
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L9        3919 L8

L10        427 L9 AND L7 AND L5 AND L3

=> e guilpain gerald/au
E1            5     GUILPAIN ERIC/AU
E2            6     GUILPAIN G/AU
E3            0 --> GUILPAIN GERALD/AU
E4            8     GUILPAIN GERARD/AU
E5            2     GUILPAIN P/AU
E6           13     GUILPAIN PHILIPPE/AU
E7            2     GUILPART B/AU
E8           16     GUILPART J/AU
E9            4     GUILPART JACQUES/AU
E10           4     GUILPIN C/AU
E11           1     GUILPIN C C/AU
E12           1     GUILPIN CH CH/AU
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=> s e4 or e2
              8 "GUILPAIN GERARD"/AU
              6 "GUILPAIN G"/AU
L11          14 "GUILPAIN GERARD"/AU OR "GUILPAIN G"/AU

=> e caron laurent/au
E1            1     CARON L M/AU
E2            4     CARON LAURENCE/AU
E3           31 --> CARON LAURENT/AU
E4           14     CARON LAURENT G/AU
E5            1     CARON LAURENT S J/AU
E6            1     CARON LEIGH/AU
E7            1     CARON LEO P R/AU
E8            1     CARON LEROY A/AU
E9           11     CARON LESLIE/AU
E10           6     CARON LESLIE LU ANN M/AU
E11           1     CARON LESLIE LU ANN MARIE/AU
E12           2     CARON LIETTE/AU

=> s e3-e5
             31 "CARON LAURENT"/AU
             14 "CARON LAURENT G"/AU
              1 "CARON LAURENT S J"/AU
L12          46 ("CARON LAURENT"/AU OR "CARON LAURENT G"/AU OR "CARON LAURENT S
               J"/AU)

=> s l10 and (l11 or l12)
L13           1 L10 AND (L11 OR L12)

=> d

L13  ANSWER 1 OF 1  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2005:258664  CAPLUS
DN   142:299850
TI   Composition based on hydrofluorocarbons and its use in refrigeration
     and/or air conditioning, and heat transfer system containing it
IN   Guilpain, Gerard; Caron, Laurent
PA   Arkema, Fr.
SO   Fr. Demande, 13 pp.
     CODEN: FRXXBL
DT   Patent
LA   French
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   FR 2860001           A1    20050325    FR 2003-11025          20030919
     FR 2860001           B1    20080215
     WO 2005028586        A2    20050331    WO 2004-FR2231         20040902
     WO 2005028586        A3    20050630
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH,
             CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD,
             GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
             LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI,
             NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY,
             TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
         RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM,
             AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK,
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             SN, TD, TG
     EP 1664234           A2    20060607    EP 2004-787286         20040902
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         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
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     CN 1852963           A     20061025    CN 2004-80027155       20040902
     JP 2007505963        T     20070315    JP 2006-526657         20040902
     US 20070187638       A1    20070816    US 2006-570938         20061222
PRAI FR 2003-11025        A     20030919
     WO 2004-FR2231       W     20040902
RE.CNT  7     THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
              ALL CITATIONS AVAILABLE IN THE RE FORMAT


=> s refrigerat###### or foam#####
         55164 REFRIGERAT######
        169659 FOAM#####
L14     223449 REFRIGERAT###### OR FOAM#####

=> s l10 and l14
L15        175 L10 AND L14

=> d 1-175 all

L15  ANSWER 1 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2008:774663  CAPLUS
DN   149:106992
ED   Entered STN:  27 Jun 2008
TI   Compositions comprising 1,2,3,3,3-pentafluoropropene with Z- and E-isomer
     ratio optimized for refrigeration performance
IN   Nappa, Mario Joseph; Minor, Barbara Haviland; Noelke, Charles Joseph
PA   E. I. Du Pont de Nemours and Company, USA
SO   PCT Int. Appl., 21pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM  C09K
CC   47-4 (Apparatus and Plant Equipment)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   WO 2008076272        A2    20080626    WO 2007-US25383        20071212
     WO 2008076272        A3    20080814
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA,
             CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI,
             GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG,
             KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,
             MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL,
             PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN,
             TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW
         RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,
             IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR, BF,
             BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW,
             GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,
             BY, KG, KZ, MD, RU, TJ, TM, AP, EA, EP, OA
PRAI US 2006-875077P      P     20061215
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 2008076272   ICM    C09K
                 IPCI   C09K0005-00 [I,C]; C09K0005-04 [I,A]; A62D0001-00
                        [I,C]; A62D0001-00 [I,A]; C08J0009-00 [I,C];
                        C08J0009-14 [I,A]; C09K0003-30 [I,C]; C09K0003-30 [I,A]
                 ECLA   C09K005/04B4B; C09K003/30
AB   The azeotropic or near-azeotropic compns. comprise .apprx.0.1 weight% to
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.apprx.99.9 weight% Z-1,2,3,3,3-pentafluoropropene (Z-1225ye) and .apprx.99.9 weight% to .apprx.0.1 weight% E-1,2,3,3,3-pentafluoropropene (E-1225ye). Refrigeration capacity for 1,2,3,3,3-pentafluoropropene (HFC-1225ye) is improved by increasing the amount of Z-isomer (Z-1225ye) relative to the amount of E-isomer (E-1225ye). The refrigerants may also be used with a foam blowing agent as a propellant and in fire suppression, total-flood fire extinguishing, and area inerting to prevent fires or explosions. The compns. have low global warming potential (GWP), low ozone depletion potential (ODP), are non-toxic, non-flammable, and provide refrigeration capacity and energy efficiency comparable to the currently used materials.

ST pentafluoropropene azeotrope refrigerant fire explosion suppression

IT Azeotropes
Blowing agents
Explosion prevention
Lubricants
Propellants (sprays and foams)
(compns. comprising 1,2,3,3,3-pentafluoropropene with Z- and E-isomer ratio optimized for refrigeration performance)

IT Alkanes, uses
Hydrocarbon oils
Hydrocarbons, uses
Naphthenes
Polyolefins
Polyoxyalkylenes, uses
RL: MOA (Modifier or additive use); USES (Uses)
(compns. comprising 1,2,3,3,3-pentafluoropropene with Z- and E-isomer ratio optimized for refrigeration performance)

IT Foams
(fire-extinguishing; compns. comprising 1,2,3,3,3-pentafluoropropene with Z- and E-isomer ratio optimized for refrigeration performance)

IT Alkenes, uses
Hydrocarbons, uses
RL: MOA (Modifier or additive use); USES (Uses)
(fluoro; compns. comprising 1,2,3,3,3-pentafluoropropene with Z- and E-isomer ratio optimized for refrigeration performance)

IT Fire extinguishers
(foams; compns. comprising 1,2,3,3,3-pentafluoropropene with Z- and E-isomer ratio optimized for refrigeration performance)

IT Alcohols, uses
RL: MOA (Modifier or additive use); USES (Uses)
(polyhydric, esters; compns. comprising 1,2,3,3,3-pentafluoropropene with Z- and E-isomer ratio optimized for refrigeration performance)

IT 71-43-2D, Benzene, alkyl derivs. 74-88-4, Methyl iodide, uses 75-10-5, Difluoromethane 75-37-6, 1,1-Difluoro ethane 115-10-6, Dimethyl ether 124-38-9, Carbon dioxide, uses 354-33-6, Penta fluoroethane 406-58-6, 1,1,1,3,3-Pentafluoro butane 407-60-3, 1,1,1,4,4,4-Hexafluoro-2-butene 420-46-2, 1,1,1-Trifluoro ethane 431-89-0, 1,1,1,2,3,3,3-Heptafluoro propane 460-73-1, 1,1,1,3,3-Pentafluoro propane 677-21-4, 3,3,3-Trifluoro propene 690-39-1, 1,1,1,3,3,3,-Hexafluoro propane 754-12-1, 2,3,3,3-Tetrafluoro propene 811-97-2, 1,1,1,2-Tetra fluoroethane 1645-83-6, 1,3,3,3-Tetrafluoro propene 7664-41-7, Ammonia, uses 9003-19-4D, Polyvinyl ether, derivs.
RL: MOA (Modifier or additive use); USES (Uses)
(compns. comprising 1,2,3,3,3-pentafluoropropene with Z- and E-isomer ratio optimized for refrigeration performance)

IT 5528-43-8 5595-10-8
RL: TEM (Technical or engineered material use); USES (Uses)

(compns. comprising 1,2,3,3,3-pentafluoropropene with Z- and E-isomer ratio optimized for refrigeration performance)

L15 ANSWER 2 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2008:673545 CAPLUS
DN 149:34564
ED Entered STN: 06 Jun 2008
TI Compositions comprising unsaturated hydrofluorocarbon compounds, and methods for heating and cooling using the compositions
IN Riva, Marcello; Fischer, Reiner
PA Solvay Fluor G.m.b.H., Germany
SO PCT Int. Appl., 37pp.
CODEN: PIXXD2
DT Patent
LA English
CC 48-5 (Unit Operations and Processes)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2008065011	A1	20080605	WO 2007-EP62432	20071115

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

PRAI	EP 2006-125041	A	20061129
	US 2007-884741P	P	20070112
	EP 2007-111872	A	20070705

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2008065011	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]; C07C0019-08 [I,A]; C07C0019-00 [I,C*]

AB The essentially pure (E) and (Z) isomers of 1,2,3,3,3-pentafluoropropene and specific mixts. thereof together with certain other compds. are suitable for application in refrigerants and other methods of use, e.g. as solvents, blowing agents, fire extinguishers, ORC liqs., heat transformer liqs., heat pipe liqs. or aerosol-producing gases.
ST heat transfer agent pentafluoropropene isomer
IT Fluorescent dyes
(UV; heat transfer agents comprising unsatd. hydrofluorocarbon compds.)
IT Passivation
(agents; heat transfer agents comprising unsatd. hydrofluorocarbon compds.)
IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoro, unsatd.; heat transfer agents comprising unsatd. hydrofluorocarbon compds.)
IT Blowing agents
Corrosion inhibitors
Fire extinguishers
Heat transfer agents
Lubricants
Propellants (sprays and foams)
Refrigerants

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     Solvents
     Stabilizing agents
     Tracers
        (heat transfer agents comprising unsatd. hydrofluorocarbon compds.)
IT   EPDM rubber
     Terpenes, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (heat transfer agents comprising unsatd. hydrofluorocarbon compds.)
IT   Nitrile rubber, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (hydrogenated; heat transfer agents comprising unsatd.
        hydrofluorocarbon compds.)
IT   Air conditioning
        (mobile; heat transfer agents comprising unsatd. hydrofluorocarbon
        compds.)
IT   74-98-6, Propane, uses 75-10-5, HFC-32   75-28-5, Isobutane
     75-37-6, HFC-152a   78-78-4, 2-Methylbutane   80-56-8, α-Pinene
     106-22-9, Citronellol   106-97-8, n-Butane, uses   109-66-0, n-Pentane,
     uses   115-10-6, Dimethyl ether   124-38-9, Carbon dioxide, uses
     127-91-3, β-Pinene   138-86-3, Limonene   287-92-3, Cyclopentane
     353-36-6, HFC-161 354-33-6, HFC-125   359-35-3, HFC-134
     371-78-8, Bis(trifluoromethyl)sulfide   406-58-6, HFC-365mfc
     420-46-2, HFC-143a   431-63-0, HFC-236ea   431-89-0, HFC-227ea
     460-73-1, HFC-245fa   677-21-4, HFC-1243zf   690-39-1, HFC-236fa
     754-12-1, HFC-1234yf 811-97-2, HFC-134a   1187-93-5,
     Perfluoromethyl vinyl ether   1645-83-6, HFC-1234ze   2314-97-8,
     Trifluoromethyl iodide   115781-23-2
     RL: MOA (Modifier or additive use); USES (Uses)
        (heat transfer agents comprising unsatd. hydrofluorocarbon compds.)
IT   112-49-2, Triglyme   116-15-4, Hexafluoropropene   998-40-3,
     Tri-n-butylphosphine
     RL: RCT (Reactant); RACT (Reactant or reagent)
        (heat transfer agents comprising unsatd. hydrofluorocarbon compds.)
IT   60-29-7, Ether, uses   5528-43-8, (Z)-1,2,3,3,3-Pentafluoropropene
     5595-10-8, (E)-1,2,3,3,3-Pentafluoropropene
     RL: TEM (Technical or engineered material use); USES (Uses)
        (heat transfer agents comprising unsatd. hydrofluorocarbon compds.)
IT   1002329-64-7, Fuchs Reniso S 46F
     RL: MOA (Modifier or additive use); USES (Uses)
        (lubricant; heat transfer agents comprising unsatd. hydrofluorocarbon
        compds.)
IT   9003-18-3D, hydrogenated
     RL: MOA (Modifier or additive use); USES (Uses)
        (nitrile rubber; heat transfer agents comprising unsatd.
        hydrofluorocarbon compds.)
RE.CNT  2     THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
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(1) Minor Barbara H; US 20060243944 A1 2006 CAPLUS
(2) Pham Hang T; US 20040127383 A1 2004 CAPLUS


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L15  ANSWER 3 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2008:673104  CAPLUS
DN   149:12499
ED   Entered STN:  06 Jun 2008
TI   Fluorocarbon-hydrocarbon mixtures as non-flammable refrigerant extenders
     for residual chlorodifluoromethane
IN   Poole, John Edward; Powell, Richard
PA   RPL Holdings Limited, UK
SO   PCT Int. Appl., 34pp.
     CODEN: PIXXD2
DT   Patent
LA   English
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CC   48-5 (Unit Operations and Processes)
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.       DATE
     ---------------     ----   --------   --------------------  --------
PI   WO 2008065331        A2    20080605   WO 2007-GB4145        20071030
     WO 2008065331        A3    20080807
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA,
             CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI,
             GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG,
             KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,
             MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL,
             PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN,
             TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW
         RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,
             IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR, BF,
             BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW,
             GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,
             BY, KG, KZ, MD, RU, TJ, TM, AP, EA, EP, OA
PRAI GB 2006-23551        A     20061127
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
 --------------  -----  ----------------------------------------------
 WO 2008065331   IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,C]; C09K0005-04 [I,A]
                 ECLA   C09K005/04B4B
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AB   Residual HFC 22 refrigerant (chlorodifluoromethane) remaining in a refrigerator device, an air conditioner, or a heat pump after leakage of part of the original refrigerant charge is extended by mixing the HFC 22 with a supplemental refrigerant comprising ≥1 organofluorine compound, or optionally with addnl. HFC-22, or with ≥1 hydrocarbons, such that the low or high temps. are achieved that are similar to those achieved when operating with its design charge (HFC-22). The compns. are non-flammable according to criteria set out in ASHRAE Standard 34. Suitable supplemental refrigerants include hydrofluorocarbons, fluoropropenes, or fluorocarbon iodides, such as HFC 32, HFC 125, HFC 143a, HFC 134a, HFC 152a, HFC 134, HFC 227ea, 1,1,1,2-tetrafluoropropene, cis- or trans-1,1,1,3-tetrafluoropropene, 1,1,1,2,3-pentafluoropropene, 1,1,1,3,3-pentafluoropropene, and trifluoroiodomethane, and hydrocarbon refrigerants such as 2-methylpropane, propane, 2,2-dimethylpropane, n-butane, 2-methylbutane, propene, n-butene, and isobutane.

ST   nonflammable refrigerant chlorofluoromethane extender fluorocarbon hydrocarbon; fluoroalkane hydrocarbon nonflammable refrigerant

IT   Air conditioners
     Heat pumps
       Refrigerating apparatus
        (chlorodifluoromethane extension in; fluorocarbon-hydrocarbon mixts. as non-flammable refrigerant extenders for residual chlorodifluoromethane)

IT   Alkanes, uses
     Alkenes, uses
     Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro, refrigerants; fluorocarbon-hydrocarbon mixts. as non-flammable refrigerant extenders for residual chlorodifluoromethane)

IT   Fire-resistant materials
        (fluorocarbon refrigerants; fluorocarbon-hydrocarbon mixts. as non-flammable refrigerant extenders for residual chlorodifluoromethane)

IT   Alkanes, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoroiodo; fluorocarbon-hydrocarbon mixts. as non-flammable refrigerant extenders for residual chlorodifluoromethane)

IT   Refrigerants
        (non-flammable; fluorocarbon-hydrocarbon mixts. as non-flammable refrigerant extenders for residual chlorodifluoromethane)

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IT   1030385-91-1, RS 45
     RL: TEM (Technical or engineered material use); USES (Uses)
        (RS 45, supplemental refrigerant; fluorocarbon-hydrocarbon mixts. as
        non-flammable refrigerant extenders for residual chlorodifluoromethane)
IT   75-45-6, R 22
     RL: MSC (Miscellaneous)
        (residual refrigerant; fluorocarbon-hydrocarbon mixts. as non-flammable
        refrigerant extenders for residual chlorodifluoromethane)
IT   74-98-6, Propane, uses 75-10-5, HFC 32   75-28-5,
     2-Methylpropane   75-37-6, HFC 152a   78-78-4, 2-Methylbutane   106-97-8,
     n-Butane, uses   115-07-1, Propene, uses 354-33-6, HFC 125
     359-35-3, HFC 134 420-46-2, HFC 143a   431-89-0, HFC 227ea
     463-82-1, 2,2-Dimethylpropane   690-27-7, 1,1,1,3,3-Pentafluoropropene
     754-12-1 811-97-2, HFC 134a   2252-83-7, 1,1,1,2,3-
     Pentafluoropropene   2314-97-8, Trifluoroiodomethane   25167-67-3,
     n-Butene   29118-24-9   29118-25-0   158675-78-6, R 407C   188654-57-1, R
     422A   929554-12-1, R 424A
     RL: TEM (Technical or engineered material use); USES (Uses)
        (supplemental refrigerant; fluorocarbon-hydrocarbon mixts. as
        non-flammable refrigerant extenders for residual chlorodifluoromethane)

L15  ANSWER 4 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2008:353375  CAPLUS
DN   148:358127
ED   Entered STN:  21 Mar 2008
TI   Method of determining the components of a fluoroolefin composition, method
     of recharging a fluid system in response thereto, and sensors used
     therefor
IN   Minor, Barbara Haviland; Mouli, Nandini C.; Laubacher, Daniel B.;
     Steichen, John Carl
PA   E.I. Du Pont De Nemours and Company, USA
SO   PCT Int. Appl., 65pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM  B01J
CC   48-2 (Unit Operations and Processes)
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
     ---------------     ----   --------   --------------------   --------
PI   WO 2008033568        A2    20080320   WO 2007-US20202        20070914
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA,
             CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI,
             GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG,
             KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,
             MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL,
             PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN,
             TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW
         RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,
             IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR, BF,
             BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW,
             GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,
             BY, KG, KZ, MD, RU, TJ, TM
PRAI US 2006-844870P      P     20060915
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 2008033568   ICM    B01J
                 IPCI   B01J [ICM,7]
OS   MARPAT 148:358127
AB   The components of a fluoroolefin composition are determined while recharging a
fluid
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system in which the composition is used, e.g., a fluoroolefin refrigerant composition used within a vapor compression system, where the refrigerant. Fluoroolefin refrigerants are useful in cooling systems as replacements for existing refrigerants with higher global warming potential. These compns. may have trifluoro groups and have double bond structures which make them particularly well suited with sensing technologies, including: IR sensors, UV and visible light sensors, NIR sensors, ion mobility or plasma chromatographs, gas chromatog., refractometry, mass spectroscopy, high temperature thick film sensors, thin film field effect sensors, pellistor sensors, Taguchi sensors and quartz microbalance sensors.

ST fluoroolefin refrigerant monitoring leak; air conditioning leak monitoring fluoroolefin; refrigerant leak monitoring fluoroolefin

IT Optical detectors
(IR; determining the components of a fluoroolefin composition suitable for use as a refrigerant and sensors therefor)

IT Optical detectors
(UV; determining the components of a fluoroolefin composition suitable for use as a refrigerant and sensors therefor)

IT Air conditioning
Control apparatus
Gas chromatographic detectors
Gas sensors
Ion mobility spectrometers
Leak
Mass spectrometers
Microbalances
Optical detectors
Refractometers
Refrigeration
(determining the components of a fluoroolefin composition suitable for use as a refrigerant and sensors therefor)

IT Alkenes, analysis
RL: ANT (Analyte); ANST (Analytical study)
(fluoro; determining the components of a fluoroolefin composition suitable for use as a refrigerant and sensors therefor)

IT Optical detectors
(near-IR; determining the components of a fluoroolefin composition suitable for use as a refrigerant and sensors therefor)

IT 74-98-6, Propane, uses 75-10-5, HFC-32 75-28-5, Isobutane 75-37-6, HFC-152a 78-78-4, 2-Methylbutane 106-97-8, n-Butane, uses 109-66-0, n-Pentane, uses 115-10-6, Dimethyl ether 124-38-9, Carbon dioxide, uses 287-92-3, Cyclopentane 353-36-6, HFC-161 354-33-6, HFC-125 359-35-3, HFC-134 371-78-8 406-58-6, HFC-365mfc 420-46-2, HFC-143a 431-63-0, HFC-236ea 431-89-0, HFC-227ea 460-73-1, HFC-245fa 690-39-1, HFC-236fa 754-12-1, HFC-1234yf 811-97-2, HFC-134a 2314-97-8, Trifluoroiodomethane 7664-41-7, Ammonia, uses 721945-75-1
RL: ANT (Analyte); MOA (Modifier or additive use); ANST (Analytical study); USES (Uses)
(determining the components of a fluoroolefin composition suitable for use as a refrigerant and sensors therefor)

IT 116-15-4 355-08-8 355-16-8 355-75-9 355-95-3 357-26-6 360-57-6 360-89-4 374-27-6 374-39-0 376-87-4 377-99-1 382-10-5 400-17-9 407-60-3 433-66-9 559-40-0 563-85-9 564-06-7 648-39-5 651-28-5 677-21-4 680-54-6 681-22-1 697-11-0 755-25-9 760-42-9 1005-73-8 1513-85-5 1513-86-6 1547-26-8 1582-32-7 1584-02-7

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     1645-83-6   1682-21-9   1735-86-0   1840-17-1   2070-70-4   2252-83-7
     2252-99-5   2253-00-1   2317-84-2   2375-68-0   2714-31-0   2714-38-7
     4556-24-5   7125-86-2   13088-33-0   13369-09-0   14115-46-9   17997-56-7
     19430-93-4   21223-06-3   22692-37-1   22692-38-2   23714-15-0
     26981-58-8   26981-59-9   38392-10-8   40723-71-5   51070-76-9
     58777-31-4   60002-06-4   70566-54-0   71039-88-8   72804-49-0
     73401-37-3   74728-73-7   83227-57-0   86154-61-2   86563-86-2
     88562-41-8   89296-44-6   90277-94-4   90277-98-8   90296-73-4
     115781-23-2   116342-01-9   119450-86-1   121789-15-9   142468-98-2
     142468-99-3   142469-00-9   142469-03-2   149632-58-6   149632-59-7
     151575-96-1   152267-17-9   158664-13-2   159148-08-0   168332-67-0
     175400-98-3   189154-79-8   206113-45-3   245677-83-2   256334-89-1
     403855-48-1   403855-49-2   403855-50-5   606929-13-9   721945-76-2
     721946-09-4   721946-10-7   721946-11-8   721946-28-7   721946-33-4
     721946-34-5   721946-35-6   721946-36-7   721946-37-8   721970-19-0
     721970-20-3   721970-21-4   887111-51-5   887111-55-9   935476-69-0
     935476-70-3   935476-71-4   935476-72-5   935476-73-6   935476-74-7
     935476-86-1   935476-87-2   935476-88-3   935476-89-4   935476-90-7
     935476-91-8   1012886-16-6
     RL: TEM (Technical or engineered material use); USES (Uses)
        (determining the components of a fluoroolefin composition suitable for use
as a
        refrigerant and sensors therefor)

L15  ANSWER 5 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2008:352875  CAPLUS
DN   148:381843
ED   Entered STN:  21 Mar 2008
TI   Synthetic refrigeration oil composition for hydrofluorocarbon
     applications
IN   Beckler, Phil; Wei, Liwen
PA   Shrieve Chemical Products, Inc., USA
SO   PCT Int. Appl., 17pp.
     CODEN: PIXXD2
DT   Patent
LA   English
CC   45-5 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
     ---------------     ----   --------   --------------------   --------
PI   WO 2008034088        A1    20080320   WO 2007-US78542        20070914
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA,
             CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI,
             GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG,
             KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,
             MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL,
             PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN,
             TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW
         RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,
             IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR, BF,
             BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW,
             GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,
             BY, KG, KZ, MD, RU, TJ, TM
     US 20080083900       A1    20080410   US 2007-855007         20070913
PRAI US 2006-825839P      P     20060915
     US 2007-855007       A     20070913
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 2008034088   IPCI   F25B0009-00 [I,A]
                 IPCR   F25B0009-00 [I,C]; F25B0009-00 [I,A]
 US 20080083900  IPCI   C09K0005-10 [I,A]; C09K0005-00 [I,C*]
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NCL   252/068.000; 252/067.000

AB   Refrigeration compns. are disclosed herein. In an embodiment, a refrigeration composition comprises a mixture of an ester of a hydroxycarboxylic acid. The hydroxycarboxylic acid has a chain length ranging from 8 to 22 carbon atoms. The composition also comprises a carrier fluid or base oil, selected from the group consisting of an alkylbenzene, an alkylated naphthenic, a polyalkylene glycol, a polyvinylether, a polyalphaolefin, mineral oil, a polyol ester, and combinations thereof, providing improved fluidity and heat transfer, and enhanced oil return.

ST   hydroxycarboxylic acid ester refrigerant lubricant

IT   Polyoxyalkylenes, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (esters with hydroxycarboxylic acid; synthetic refrigeration oil composition for hydrofluorocarbon applications)

IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro; synthetic refrigeration oil composition for hydrofluorocarbon applications)

IT   Carboxylic acids, uses
     Fatty acids, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (hydroxy, esters; synthetic refrigeration oil composition for hydrofluorocarbon applications)

IT   Lubricants
     Refrigerants
        (synthetic refrigeration oil composition for hydrofluorocarbon applications)

IT   Hydrocarbon oils
     Polyolefins
     Polyoxyalkylenes, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (synthetic refrigeration oil composition for hydrofluorocarbon applications)

IT   151-13-3P, Ricinoleic acid butyl ester   71685-99-9P, Ricinoleic acid iso-propyl ester   1013625-34-7P   1013632-20-6P
     RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
        (synthetic refrigeration oil composition for hydrofluorocarbon applications)

IT   71-43-2D, Benzene, alkyl 75-10-5, R32   75-37-6, R152a
     75-46-7, R23   76-16-4, R116   115-11-7, Isobutene, uses   124-38-9, Carbon dioxide, uses   141-22-0D, Ricinoleic acid, esters 354-33-6
     , R125 420-46-2, R143a 811-97-2, R134a   1330-70-7D, Hydroxystearic acid, esters   41376-14-1D, esters   41539-58-6D, Hydroxypalmitic acid, esters   69845-59-6D, esters   74355-65-0D, esters 85791-94-2D, esters   101311-24-4D, esters   1013632-19-3D, esters
     RL: TEM (Technical or engineered material use); USES (Uses)
        (synthetic refrigeration oil composition for hydrofluorocarbon applications)

RE.CNT 1   THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Obara; US 5593957 A 1997 CAPLUS

L15 ANSWER 6 OF 175 CAPLUS

AN   2008:91148 CAPLUS

DN   148:194474

ED   Entered STN: 24 Jan 2008

TI   Heat transfer compositions

IN   Low, Robert Elliot; Corr, Stuart

PA   Ineos Fluor Holdings Limited, UK

SO   PCT Int. Appl., 52pp.
     CODEN: PIXXD2

DT Patent
LA English
CC 48-5 (Unit Operations and Processes)
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2008009923	A2	20080124	WO 2007-GB2700	20070717
	WO 2008009923	A3	20080313		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AP, EA, EP, OA

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	GB 2437373	A	20071024	GB 2006-19504	20061003
	DE 202007008290	U1	20071108	DE 2007-202007008290	20070613
PRAI	GB 2006-14067	A	20060717		
	GB 2006-19504	A	20061003		
	GB 2007-6994	A	20070411		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2008009923	IPCI	C09K0005-04 [I,A]; C08J0009-14 [I,A]; C11D0007-50 [I,A]; C09K0005-00 [I,C]; C09K0005-04 [I,A]; C08J0009-00 [I,C]; C08J0009-14 [I,A]; C11D0007-50 [I,C]; C11D0007-50 [I,A]
	IPCR	C09K0005-00 [I,C]; C09K0005-04 [I,A]; C08J0009-00 [I,C]; C08J0009-14 [I,A]; C11D0007-50 [I,C]; C11D0007-50 [I,A]
	ECLA	C09K005/04B4B; C11D007/50A6
GB 2437373	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]; C09K0003-30 [I,A]
	ECLA	C09K005/04B4B; C09K003/30
DE 202007008290	IPCI	C08K0005-04 [I,A]; C08K0005-00 [I,C*]; C08J0009-14 [I,A]; C08J0009-00 [I,C*]; C08L0075-04 [I,A]; C08L0075-00 [I,C*]

AB A heat transfer composition comprising: (i) R-1225yeZ; (ii) R-32, R-161, or R-152a; and (iii) at least one further refrigerant selected from carbon dioxide (R-744); fluoromethane (R-41); fluoroethane (R-161); 1,1,1-trifluoroethane (R-143a); 1,1,1,2-tetrafluoroethane (R-134a); 1,1,2,2-tetrafluoroethane (R-134); di-Me ether; heptafluoropropane (R-227ea); propane (R-290); propene (R-1270); isobutane (R-600a); n-butane (R-600) 2,3,3,3-tetrafluoropropene (R-1234yf); 1,1- difluorocyclopropane; 1,1,2-trifluorocyclopropane; 1,1,2,2- tetrafluorocyclopropane; pentafluorocyclopropane, pentafluoroethane (R- 125) or ammonia or mixts. thereof. In the context of the invention, unless otherwise specified, R-1225yeZ refers to a composition having a content of R-1225yeZ in the R-1225ye component which is at least 95 % Z isomer, more preferably at least 98% Z isomer, more preferably at least 99% Z isomer, and may in some instances be pure Z isomer, whereas the remaining minor component of any such R1225yeZ or R-1225ye composition will be the E isomer.

ST refrigerant propellant heat transfer agent

IT Epoxy resins, miscellaneous
Polyurethanes, miscellaneous
RL: MSC (Miscellaneous)
(blowing agents for; foamable heat transfer composition for use in

refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Amines, uses
RL: MOA (Modifier or additive use); USES (Uses)
(bromofluoroalkyl and perfluoroalkyl; flame retardant; foamable heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Alkenes, uses
RL: MOA (Modifier or additive use); USES (Uses)
(fluoro, R-1225yeZ; foamable heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Hydrocarbons, uses
RL: MOA (Modifier or additive use); USES (Uses)
(fluorobromo and fluoroiodo derivs.; flame retardant; foamable heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Air conditioning
Blowing agents
Freezers
Heat pumps
Heat transfer
Heat transfer agents
Lubricating oils
Propellants (sprays and foams)
Refrigerants
Refrigerating apparatus
Solvent extraction
(foamable heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Aromatic compounds
RL: MOA (Modifier or additive use); USES (Uses)
(halogenated; flame retardants; foamable heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Polyolefins
Polyoxyalkylenes, uses
Polysiloxanes, uses
RL: MOA (Modifier or additive use); USES (Uses)
(lubricants; foamable heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Alcohols, uses
RL: MOA (Modifier or additive use); USES (Uses)
(polyhydric, esters, lubricants; foamable heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Toxicity
(reduction of; foamable heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Epoxides
Phenols, uses
Phosphates, uses
RL: MOA (Modifier or additive use); USES (Uses)
(stabilizers; foamable heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Plastics, miscellaneous
RL: MSC (Miscellaneous)
(thermoplastics, blowing agents for; foamable heat transfer

composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT 115-96-8, Tri(2-chloroethyl) phosphate 1309-64-4, Antimony oxide (Sb2O3), uses 1327-33-9, Antimony oxide 2314-97-8, Trifluoroiodomethane 7664-38-2D, Phosphoric acid, Chloropropyl esters 7783-28-0, Diammonium phosphate 9002-86-2, Polyvinyl chloride 40120-74-9
RL: TEM (Technical or engineered material use); USES (Uses)
(flame retardant; foamable heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT 74-98-6, Propane, uses 75-10-5, R-32 75-28-5, Isobutane 75-37-6, R-152a 106-97-8, n-Butane, uses 115-07-1, Propene, uses 115-10-6, Dimethyl ether 124-38-9, (R-744, uses 353-36-6, R-161 354-33-6, Pentafluoroethane 359-35-3, 1,1,2,2-Tetrafluoroethane 420-46-2, 1,1,1-Trifluoroethane 558-29-2, 1,1-Difluorocyclopropane 593-53-3, Fluoromethane 754-12-1, 2,3,3,3-Tetrafluoropropene 811-97-2, 1,1,1,2-Tetrafluoroethane 872-58-2, Pentafluorocyclopropane 2252-84-8, Heptafluoropropane 3899-71-6, 1,1,2,2-Tetrafluorocyclopropane 3899-72-7, 1,1,2-Trifluorocyclopropane 7664-41-7, Ammonia, uses
RL: MOA (Modifier or additive use); USES (Uses)
(foamable heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT 71-43-2D, Benzene, alkyl derivs. 9003-19-4D, Polyvinyl ether, derivs.
RL: TEM (Technical or engineered material use); USES (Uses)
(lubricants; foamable heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT 5595-10-8, R 1225YeE
RL: TEM (Technical or engineered material use); USES (Uses)
(predominantly or purely Z isomer; foamable heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

L15 ANSWER 7 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2007:1469488 CAPLUS
DN 148:79831
ED Entered STN: 27 Dec 2007
TI Thermoplastic foam blowing agent combinations
IN Bertelo, Christopher A.; Van Horn, Brett L.
PA Arkema Inc., USA
SO PCT Int. Appl., 18pp.
CODEN: PIXXD2
DT Patent
LA English
CC 37-2 (Plastics Manufacture and Processing)
Section cross-reference(s): 38
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2007149893	A2	20071227	WO 2007-US71615	20070620
	WO 2007149893	A3	20080807		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,

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             IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR, BF,
             BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW,
             GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,
             BY, KG, KZ, MD, RU, TJ, TM, AP, EA, EP, OA
PRAI US 2006-815338P      P     20060621
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 2007149893   IPCI   C08K0005-02 [I,A]; C08K0005-00 [I,C]; C08K0005-00 [I,A]
                 IPCR   C08K0005-00 [I,C]; C08K0005-02 [I,A]
AB   A blowing agent for thermoplastic foams such as extruded
     polystyrene foam is disclosed.  The blowing agent is a blend of
     a low solubility blowing agent, such as 1,1,1,2-tetrafluoroethane, and a
     dichloroethylene such as trans-1,2-dichloroethylene.  The blowing agent
     combination enhances processibility of thermoplastic foam.
ST   thermoplastic foam blowing agent dichloroethylene
     tetrafluoroethane blend
IT   Hydrocarbons, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (blowing agents; thermoplastic foam blowing agent
        combinations)
IT   Hydrocarbons, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (fluoro, blowing agents; thermoplastic foam blowing agent
        combinations)
IT   Blowing agents
     Extrusion of plastics and rubbers
        (thermoplastic foam blowing agent combinations)
IT   Plastic foams
     RL: TEM (Technical or engineered material use); USES (Uses)
        (thermoplastic; thermoplastic foam blowing agent
        combinations)
IT   75-10-5, Difluoromethane   75-37-6, 1,1-Difluoroethane   124-38-9,
     Carbon dioxide, uses   156-60-5, trans-1,2-Dichloroethylene
     354-33-6, Pentafluoroethane   359-35-3, 1,1,2,2-Tetrafluoroethane
     420-46-2, 1,1,1-Trifluoroethane   430-66-0, 1,1,2-Trifluoroethane
     431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane 811-97-2, HFC 134a
     RL: MOA (Modifier or additive use); USES (Uses)
        (blowing agent; thermoplastic foam blowing agent
        combinations)
IT   9003-53-6, Polystyrene
     RL: TEM (Technical or engineered material use); USES (Uses)
        (thermoplastic foam blowing agent combinations)

L15  ANSWER 8 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2007:1419948  CAPLUS
DN   148:57478
ED   Entered STN:  13 Dec 2007
TI   Vapor compression utilizing ionic liquid as compressor lubricant
IN   Shiflett, Mark Brandon; Yokozeki, Akimichi
PA   E. I. Du Pont De Nemours and Company, USA
SO   PCT Int. Appl., 160pp.
     CODEN: PIXXD2
DT   Patent
LA   English
CC   48-5 (Unit Operations and Processes)
     Section cross-reference(s): 27, 28, 47, 51, 68
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
     ---------------     ----   --------   --------------------   --------
PI   WO 2007143051        A2    20071213   WO 2007-US12866        20070531
     WO 2007143051        A3    20080619
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W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AP, EA, EP, OA

PRAI US 2006-809622P P 20060531

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2007143051	IPCI	C09K0005-04 [I,A]; F25B0009-00 [I,A]; F25B0031-00 [I,A]; C09K0005-00 [I,C]; C09K0005-04 [I,A]; F25B0009-00 [I,C]; F25B0009-00 [I,A]; F25B0031-00 [I,C]; F25B0031-00 [I,A]
	IPCR	C09K0005-00 [I,C]; C09K0005-04 [I,A]; F25B0009-00 [I,C]; F25B0009-00 [I,A]; F25B0031-00 [I,C]; F25B0031-00 [I,A]
	ECLA	C09K005/04B; F25B031/00B

OS MARPAT 148:57478

AB This invention relates to the use of ionic liqs. as lubricants in vapor compression systems for cooling or heating. This invention also relates to an apparatus for adjusting temperature that operates a vapor compression cycle.

ST vapor compression cycle ionic liq synthesis compressor lubricant equil; refrigerating heating app ionic liq lubricant refrigerant cycle compatibility

IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(C1-C8, refrigerant; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Naphthenic oils
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(SUNISO 3GS and 5GS, plain and mixts. with R-22; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Hydrocarbon oils
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(SUNISO 4GS, plain and mixts. with R-22; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Cooling apparatus
(air conditioning; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Lubricating oils
(compressor; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Air conditioners
(cooling apparatus; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Alkenes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoro, C5-C12, refrigerant; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)

(fluoro, refrigerants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Anions

(fluoro- containing, salts with onium and ring-containing organic cations, lubricants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Cycloalkenes

RL: TEM (Technical or engineered material use); USES (Uses)

(fluoro-, C4-C7-, refrigerant; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Phosphonium compounds

Quaternary ammonium compounds, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(halogenated, mono- to tri- substituted with hydrocarbyl-, halo-, hydroxy-, amino-, thiol-, cyclic-, and heterocyclic- containing groups, salts, lubricants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Air conditioners

(heaters; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Freezers

(ice machines; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Onium compounds

RL: TEM (Technical or engineered material use); USES (Uses)

(imidazolium compds., mono- to penta- substituted with hydrocarbyl-, halo-, hydroxy-, amino-, thiol-, cyclic-, and heterocyclic- containing groups, salts, lubricants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Phosphonium compounds

Quaternary ammonium compounds, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(lubricants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Pyridinium compounds

RL: TEM (Technical or engineered material use); USES (Uses)

(mono- to hexa- substituted with hydrocarbyl-, halo-, hydroxy-, amino-, thiol-, cyclic- and heterocyclic- containing groups, salts, lubricants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Phosphonium compounds

Quaternary ammonium compounds, uses

RL: TEM (Technical or engineered material use); USES (Uses)

(mono- to tetra- substituted with hydrocarbyl-, halo-, hydroxy-, amino-, thiol-, cyclic-, and heterocyclic- containing groups, salts, lubricants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Viscosity

(of ionic liqs. and refrigerant/ionic liquid mixts.; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Solubility

(of lubricants in refrigerant solns.; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Compression

(of refrigerant vapors; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Vapor-liquid equilibrium

(of refrigerant/lubricant mixts.; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT Diffusion

(of refrigerants and ionic liquid mixts.; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)
IT Process control
(of temperature in refrigerant vapor compression cycle; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)
IT Pyridinium compounds
RL: TEM (Technical or engineered material use); USES (Uses)
(salts, lubricants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)
IT Condensers
Evaporators
Freezers
Heat pumps
Ionic liquids
Refrigerants
Refrigerating apparatus
Thermoregulators
(vapor compression in apparatus utilizing ionic liquid as compressor lubricant)
IT Expansion
(with depressurization, apparatus for; vapor compression in apparatus utilizing
ionic liquid as compressor lubricant)
IT 109207-22-9
RL: TEM (Technical or engineered material use); USES (Uses)
(E-134, refrigerant; vapor compression in apparatus utilizing ionic liquid as
compressor lubricant)
IT 115-10-6, Dimethyl ether
RL: TEM (Technical or engineered material use); USES (Uses)
(E-170, refrigerant; vapor compression in apparatus utilizing ionic liquid as
compressor lubricant)
IT 354-33-6, Pentafluoroethane
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(R-125, refrigerant, plain and mixts. with ionic liqs.; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)
IT 359-35-3, 1,1,2,2-Tetrafluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(R-134, refrigerant; vapor compression in apparatus utilizing ionic liquid as
compressor lubricant)
IT 811-97-2, 1,1,1,2-Tetrafluoroethane
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(R-134a, refrigerant, plain and mixts. with ionic liqs.; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)
IT 75-68-3, 1-Chloro-1,1-difluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(R-142b, refrigerant; vapor compression in apparatus utilizing ionic liquid as
compressor lubricant)
IT 75-37-6, 1,1-Difluoroethane
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(R-152a, refrigerant, plain and mixts. with ionic liqs.; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)
IT 353-36-6, Fluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(R-161, refrigerant; vapor compression in apparatus utilizing ionic liquid as

compressor lubricant)
IT 76-19-7, Perfluoropropane
RL: TEM (Technical or engineered material use); USES (Uses)
(R-218, refrigerant; vapor compression in apparatus utilizing ionic liquid
as
compressor lubricant)
IT 75-45-6, Chlorodifluoromethane
RL: PRP (Properties); TEM (Technical or engineered material use); USES
(Uses)
(R-22, refrigerant, plain and mixts. with lubricants; vapor compression
in apparatus utilizing ionic liquid as compressor lubricant)
IT 431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane
RL: TEM (Technical or engineered material use); USES (Uses)
(R-227ea, refrigerant; vapor compression in apparatus utilizing ionic liquid
as compressor lubricant)
IT 75-46-7, Trifluoromethane
RL: PRP (Properties); TEM (Technical or engineered material use); USES
(Uses)
(R-23, refrigerant, plain and mixts. with lubricants; vapor compression
in apparatus utilizing ionic liquid as compressor lubricant)
IT 690-39-1, 1,1,1,3,3,3-Hexafluoropropane
RL: TEM (Technical or engineered material use); USES (Uses)
(R-236fa, refrigerant; vapor compression in apparatus utilizing ionic liquid
as compressor lubricant)
IT 679-86-7, 1,1,2,2,3-Pentafluoropropane
RL: TEM (Technical or engineered material use); USES (Uses)
(R-245ca, refrigerant; vapor compression in apparatus utilizing ionic liquid
as compressor lubricant)
IT 460-73-1, 1,1,1,3,3-Pentafluoropropane
RL: TEM (Technical or engineered material use); USES (Uses)
(R-245fa, refrigerant; vapor compression in apparatus utilizing ionic liquid
as compressor lubricant)
IT 74-98-6, n-Propane, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(R-290, refrigerant; vapor compression in apparatus utilizing ionic liquid
as
compressor lubricant)
IT 75-10-5, Difluoromethane
RL: PRP (Properties); TEM (Technical or engineered material use); USES
(Uses)
(R-32, refrigerant, plain and mixts. with ionic liqs.; vapor
compression in apparatus utilizing ionic liquid as compressor lubricant)
IT 593-53-3, Methyl fluoride
RL: TEM (Technical or engineered material use); USES (Uses)
(R-41, refrigerant; vapor compression in apparatus utilizing ionic liquid as
compressor lubricant)
IT 106-97-8, n-Butane, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(R-600, refrigerant; vapor compression in apparatus utilizing ionic liquid
as
compressor lubricant)
IT 109-66-0, n-Pentane, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(R-601, refrigerant; vapor compression in apparatus utilizing ionic liquid
as
compressor lubricant)
IT 60-29-7, Diethyl ether, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(R-610, refrigerant; vapor compression in apparatus utilizing ionic liquid
as
compressor lubricant)
IT 270908-51-5P, 1,3-Dioctylimidazolium iodide

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PUR (Purification or recovery); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(lubricant, mixts. with refrigerants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 188589-28-8P, 1-Octyl-3-methylimidazolium iodide
RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(lubricant, mixts. with refrigerants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 155371-19-0, 1-Ethyl-3-methylimidazolium hexafluorophosphate 960013-26-7
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(lubricant, mixts. with refrigerants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 169051-76-7, 1,2-Dimethyl-3-propylimidazolium bis(trifluoromethylsulfonyl)imide
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(lubricant, plain and mixts. with R-32; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 174501-64-5, 1-Butyl-3-methylimidazolium hexafluorophosphate
174501-65-6, 1-Butyl-3-methylimidazolium tetrafluoroborate
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(lubricant, plain and mixts. with refrigerants and CO2; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 880084-62-8P 880084-63-9P 880084-66-2P 880084-72-0P 905298-95-5P 905298-97-7P
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PUR (Purification or recovery); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(lubricant, plain and mixts. with refrigerants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 880084-65-1P
RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(lubricant, plain and mixts. with refrigerants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 357-31-3 169051-77-8, 1,2-Dimethyl-3-propylimidazolium tris(trifluoromethylsulfonyl)methide 174899-82-2 216299-76-2 284049-75-8, 1-Butyl-3-methylimidazolium acetate 342789-81-5 344790-86-9, 1-Butyl-3-methylpyridinium bis(trifluoromethylsulfonyl)imide 344790-87-0, 1-Butyl-3-methylimidazolium thiocyanate 817575-06-7 880084-64-0 880084-68-4
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(lubricant, plain and mixts. with refrigerants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 71-47-6D, Formate, salts with onium and ring-containing organic cations, uses
71-52-3D, Bicarbonate, salts with onium and ring-containing organic cations, uses
76-05-1D, salts with onium and ring-containing organic cations, uses
288-88-0D,
1H-1,2,4-Triazole, mono- to tetra- substituted with hydrocarbyl-, halo-, hydroxy-, amino-, thiol-, cyclic- and heterocyclic- containing groups, salts
288-88-0D, 1H-1,2,4-Triazole, salts 302-04-5D, Thiocyanate ion, salts with onium and ring-containing organic cations, uses 3812-32-6D, Carbonate, salts with onium and ring-containing organic cations, uses 14066-19-4D, Hydrogen phosphate ion(2-), salts with onium and ring-containing organic cations,

uses 14066-20-7D, Dihydrogen phosphate ion, salts with onium and ring-containing organic cations, uses 14265-44-2D, Phosphate ion(3-), salts with onium and ring-containing organic cations, uses 14797-55-8D, Nitrate, salts with onium and ring-containing organic cations, uses 14797-65-0D, Nitrite, salts with onium and ring-containing organic cations, uses 14808-79-8D, Sulfate, salts with onium and ring-containing organic cations, uses
14874-70-5D, Tetrafluoroborate, salts with onium and ring-containing organic cations 14996-02-2D, Hydrogen sulfate ion (1-), salts with onium and ring-containing organic cations, uses 15181-46-1D, salts with onium and ring-containing organic cations 15697-16-2D, salts with onium and ring-containing
organic cations 16887-00-6D, Chloride, salts with onium and ring-containing organic cations, uses 16919-18-9D, Hexafluorophosphate, salts with onium and ring-containing organic cations 16984-48-8D, Fluoride, salts with onium and
ring-containing organic cations, uses 17009-91-5D, mono- to penta- substituted
with hydrocarbyl-, halo-, hydroxy-, amino-, thiol-, cyclic- and heterocyclic- containing groups, salts 17009-91-5D, salts 17009-93-7D, mono- to penta- substituted with hydrocarbyl-, halo-, hydroxy-, amino-, thiol-, cyclic- and heterocyclic- containing groups, salts 17009-93-7D, salts 17009-95-9D, mono- to penta- substituted with hydrocarbyl-, halo-, hydroxy-, amino-, thiol-, cyclic- and heterocyclic- containing groups, salts 17009-95-9D, salts 17009-97-1D, salts 17111-95-4D, salts with onium and ring-containing organic cations 17611-22-2D, salts with onium and ring-containing organic cations 20461-54-5D, Iodide, salts with onium and ring-containing organic cations, uses 21228-90-0D, salts with onium and ring-containing organic cations 24959-67-9D, Bromide, salts with onium and ring-containing organic cations, uses 28589-79-9D, Thiazolium, mono- to tetra-
substituted with hydrocarbyl-, halo-, hydroxy-, amino-, thiol-, cyclic- and heterocyclic- containing groups, salts 28589-79-9D, Thiazolium, salts 37181-39-8D, Trifluoromethanesulfonate, salts with onium and ring-containing organic cations 46928-10-3D, salts 48028-76-8D, Ethyl sulfate ion, salts with onium and ring-containing organic cations 64001-57-6D, mono- to tetra- substituted with hydrocarbyl-, halo-, hydroxy-, amino-, thiol-, cyclic- and heterocyclic- containing groups, salts 64001-57-6D, salts 64111-53-1D, salts 65039-03-4D, 1-Ethyl-3-methylimidazolium, salts 80432-08-2D, 1-Butyl-3-methylimidazolium, salts 81994-86-7D, 1-Heptyl-3-methylimidazolium, salts 82113-65-3D, Bis(trifluoromethanesulfonyl)imide, salts with onium and ring-containing organic
cations 88986-18-9D, salts with onium and ring-containing organic cations 88986-19-0D, salts with onium and ring-containing organic cations 91582-83-1D,
Tributyl(tetradecyl)phosphonium, salts 113507-82-7D, salts with onium and ring-containing organic cations 125867-77-8D, salts 130447-45-9D, salts with onium and ring-containing organic cations 152894-10-5D, Bis(pentafluoroethylsulfonyl)imide, salts with onium and ring-containing organic
cations 157310-70-8D, 1,2-Dimethyl-3-propylimidazolium, salts 172870-67-6D, salts with onium and ring-containing organic cations 178631-03-3D, 1-Octyl-3-methylimidazolium, salts 220749-77-9D, salts 374683-43-9D, salts 746586-23-2D, salts with onium and ring-containing organic
cations 783285-28-9D, salts with onium and ring-containing organic cations
801209-99-4D, salts with onium and ring-containing organic cations
880084-61-7D, salts with onium and ring-containing organic cations
880084-71-9D, salts with onium and ring-containing organic cations
905363-44-2D, salts with onium and ring-containing organic cations
960013-25-6D, salts with onium and ring-containing organic cations

RL: TEM (Technical or engineered material use); USES (Uses)
(lubricants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 188654-57-1, R 422D
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerant, R 422a, R 422b, R 422c, and R 422d; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 124-38-9, Carbon dioxide, properties
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(refrigerant, blends with ionic liquid lubricants; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 420-46-2, R-143a
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(refrigerant, plain and mixts. with ionic liqs.; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 1763-27-5 3823-94-7
RL: RCT (Reactant); TEM (Technical or engineered material use); RACT (Reactant or reagent); USES (Uses)
(refrigerant; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 75-28-5, R-600a 78-78-4, R-601a 115-07-1, Propene, uses 355-08-8, 3,3,4,4,5,5,5-Heptafluoro-1-pentene 355-16-8 355-95-3, 4,4,5,5,6,6,6-Heptafluoro-2-hexene 357-26-6 360-57-6 374-27-6, 3,3,4,4,4-Pentafluoro-1-butene 374-39-0, 2,3,3,4,4,4-Hexafluoro-1-butene 376-87-4, 1,1,2,3,3,4,4,5,5,5-Decafluoro-1-pentene 377-99-1 382-10-5, 3,3,3-Trifluoro-2-(trifluoromethyl)-1-propene 400-17-9 563-85-9, 1,1,2-Trifluoro-1-propene 564-06-7, 1,1,2,3,3-Pentafluoro-1-butene 648-39-5 651-28-5 680-54-6, 1,1,2,3,3,4,4-Heptafluoro-1-butene 681-22-1, 1,1,3,3,4,4,4-Heptafluoro-1-butene 755-25-9 760-42-9, 1,1,1,2,4,4,4-Heptafluoro-2-butene 1513-85-5 1547-26-8, 2,3,3,4,4,5,5-Heptafluoro-1-pentene 1582-32-7 1584-02-7 1682-21-9, 1,3,4,4,4-Pentafluoro-3-(trifluoromethyl)-1-butene 1735-86-0 1840-17-1 2070-70-4, 1,1,1,2,3,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-2-pentene 2252-99-5, 1,1,2,4,4-Pentafluoro-2-butene 2253-00-1, 1,1,3,3,3-Pentafluoro-2-methyl-1-propene 2317-84-2 2375-68-0 2714-31-0, 1,3,3,3-Tetrafluoro-2-(trifluoromethyl)-1-propene 7664-41-7, Ammonia, uses 13088-33-0 13369-09-0 14115-46-9 17997-56-7, 1,1,2,3,4,4-Hexafluoro-2-butene 19430-93-4, 3,3,4,4,5,5,6,6,6-Nonafluoro-1-hexene 21223-06-3 22692-37-1 22692-38-2 23714-15-0 26981-58-8, 2-(Difluoromethyl)-3,3,3-trifluoro-1-propene 26981-59-9, 3,3-Difluoro-2-(difluoromethyl)-1-propene 38392-10-8 40723-71-5, 3,3,4,4-Tetrafluoro-1-butene 51070-76-9, 1,1,2,3,3,4,4,5,5-Nonafluoro-1-pentene 58777-31-4 60002-06-4, 1,1,2,3,4,4,4-Heptafluoro-1-butene 70566-54-0, 1,2,3,4,4,4-Hexafluoro-1-butene 71039-88-8 72804-49-0, 1,1,1,2,3,4,4,5,5,5-Decafluoro-2-pentene 73401-37-3, 1,1,1,3,4,4,5,5,5-Nonafluoro-2-pentene 74728-73-7, 1,1,1,2-Tetrafluoro-2-butene 83227-57-0, 1,2,3,3,4,4,4-Heptafluoro-1-butene 86154-61-2, 1,1,1,2,4,4,5,5,5-Nonafluoro-2-pentene 88562-41-8, 3,4,4,4-Tetrafluoro-3-(trifluoromethyl)-1-butene 90277-94-4, 1,1,1,4,4,5,5,5-Octafluoro-2-(trifluoromethyl)-2-pentene 90277-98-8 90296-73-4 116342-01-9, 1,1,1,2,3,4,4-Heptafluoro-2-butene 119450-86-1, 1,1,2,3,4-Pentafluoro-2-butene 121789-15-9 142468-99-3 142469-00-9 142469-03-2 149632-58-6, 1,1,1,3,4,4,5,5,6,6,7,7,7-Tridecafluoro-2-heptene 149632-59-7, 1,1,1,2,4,4,5,5,6,6,7,7,7-Tridecafluoro-2-heptene 150621-87-7, R-507A 150743-07-0, R-404A 151575-96-1, 1,1,1,3,4,5,5,5-Octafluoro-4-(trifluoromethyl)-2-pentene 158664-13-2, 2,3,3-Trifluoro-1-propene 158941-55-0, R 423A 159148-08-0 168332-67-0 173268-57-0, R 427A 175400-98-3, 1,1,1,2,4-Pentafluoro-2-butene 188653-05-6, R 413A 189154-79-8 224174-48-5, R-417A 245677-83-2 256334-89-1, 1,1,2,3,4,4-Hexafluoro-1-butene 332010-73-8,

R-421B   403855-48-1, 1,1,1,2,3-Pentafluoro-2-butene   403855-49-2
403855-50-5   606929-13-9   721945-75-1   721945-76-2   721946-09-4,
1,2,3,4,4-Pentafluoro-1-butene   721946-10-7, 2,3,3,4,4-Pentafluoro-1-butene   721946-11-8, 1,2,3,3,4,4-Hexafluoro-1-butene   721946-28-7,
1,1,1,3-Tetrafluoro-2-butene   721946-33-4, 1,1,1,3,4-Pentafluoro-2-butene
721946-34-5, 1,1,1,4,4-Pentafluoro-2-butene   721946-35-6,
1,1,1,2,3,4-Hexafluoro-2-butene   721946-36-7, 1,1,1,2,4,4-Hexafluoro-2-butene   721946-37-8, 1,1,1,3,4,4-Hexafluoro-2-butene   721970-19-0,
1,2,4,4,4-Pentafluoro-1-butene   721970-20-3, 2,3,4,4,4-Pentafluoro-1-butene   721970-21-4, 1,1,2,3,3,4-Hexafluoro-1-butene   887111-51-5,
2,3,3,4,4,5,5,5-Octafluoro-1-pentene   887111-53-7, 3,4,4,5,5,5-Hexafluoro-2-pentene   887111-55-9, 3,4,4,5,5,6,6,6-Octafluoro-2-hexene
913375-65-2, R 421A   929554-09-6, R-426A   929554-12-1, R-424A
935476-69-0, 1,3,3,3-Tetrafluoro-2-methyl-1-propene   935476-70-3
935476-71-4   935476-72-5   935476-73-6   935476-74-7   935476-84-9
935476-86-1   935476-87-2   935476-88-3, 1,3,3,4,4,4-Hexafluoro-1-butene
935476-89-4   935476-90-7   959923-87-6, R 419A   959923-88-7, R 425A
959923-89-8, R 428A
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerant; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT   158675-78-6, R-407C
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerants R-407A, R-407B, R-407C; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT   133023-17-3, R-410A
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerants R-410A, R-410B; vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT   7447-40-7, Potassium chloride, processes   7681-11-0, Potassium iodide, processes
RL: FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); REM (Removal or disposal); FORM (Formation, nonpreparative); PROC (Process)
(vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT   16731-55-8, Potassium metabisulfite
RL: MOA (Modifier or additive use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
(vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT   905298-91-1P
RL: PEP (Physical, engineering or chemical process); PRPH (Prophetic); PRP (Properties); PUR (Purification or recovery); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT   905298-85-3P   905298-87-5P
RL: PEP (Physical, engineering or chemical process); PRPH (Prophetic); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT   905298-71-7P, Potassium 1,1,2,2-tetrafluoroethanesulfonate   905298-74-0P, Potassium 1,1,2-trifluoro-2-(trifluoromethoxy)ethanesulfonate
960013-27-8P
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PUR (Purification or recovery); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); RACT (Reactant or reagent)
(vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT   3916-24-3P, Sodium 1,1,2,3,3,3-hexafluoropropanesulfonate   905298-76-2P
905298-81-9P   905298-83-1P   905298-99-9P   905299-01-6P   905299-03-8P

960013-29-0P
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PUR (Purification or recovery); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 874968-23-7P
RL: PEP (Physical, engineering or chemical process); PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); RACT (Reactant or reagent)
(vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 91047-49-3P
RL: PEP (Physical, engineering or chemical process); PUR (Purification or recovery); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); RACT (Reactant or reagent)
(vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 111-83-1, Octyl bromide 116-14-3, Tetrafluoroethene, reactions 116-15-4, Hexafluoropropene 288-32-4, Imidazole, reactions 616-47-7, 1-Methylimidazole 629-27-6, 1-Iodooctane 3115-68-2, Tetra-n-butylphosphonium bromide 7553-56-2, Iodine, reactions 7631-90-5, Sodium bisulfite 7757-83-7, Sodium sulfite 10117-38-1, Potassium sulfite 26914-02-3, Iodopropane 29759-38-4, Tetrafluoroethane 61546-01-8, 1-Hexadecyl-3-methylimidazolium chloride 65039-09-0, 1-Ethyl-3-methylimidazolium chloride 79917-90-1, 1-Butyl-3-methylimidazolium chloride 81741-28-8 98892-75-2, 1-Butyl-2,3-dimethylimidazolium chloride 114569-84-5, 1-Dodecyl-3-methylimidazolium chloride 117205-07-9 171058-17-6, 1-Hexyl-3-methylimidazolium chloride 171058-19-8, 1-Octadecyl-3-methylimidazolium chloride 258864-54-9, Cyphos IL 101 905298-79-5, Potassium 1,1,2,3,3,3-hexafluoropropanesulfonate
RL: RCT (Reactant); RACT (Reactant or reagent)
(vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

IT 17009-97-1D, mono- to tetra- substituted with hydrocarbyl-, halo-, hydroxy-, amino-, thiol, cyclic- and heterocyclic- containing groups, salts, lubricants
RL: TEM (Technical or engineered material use); USES (Uses)
(vapor compression in apparatus utilizing ionic liquid as compressor lubricant)

L15 ANSWER 9 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN

AN 2007:1407977 CAPLUS

DN 148:35708

ED Entered STN: 11 Dec 2007

TI Performance characteristics of vapor compression refrigeration cycle based on Ericsson Cycle

AU Ino, Nobumi; Kishi, Takayuki; Nishio, Toshio

CS Advanced Technology Laboratory, Mayekawa Mfg. Co., Ltd., 2000 Tatsuzawa, Moriya City, Ibaraki Pref., 302-0118, Japan

SO Nippon Reito Kucho Gakkai Ronbunshu (2007), 24(3), 159-166
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PB Nippon Reito Kucho Gakkai

DT Journal

LA Japanese

CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 69

AB The purpose of this research is to confirm and clarify the performance characteristics of the vapor compression refrigeration cycle based on the Ericsson cycle. The theor. anal. and comparison are performed of the performance of the conventional refrigeration

cycle with the Ericsson cycle using 12 different refrigerants. There are conditions for maximizing the COP of the Ericsson cycle using the expansion valve, both the COP and refrigeration capacity using the Ericsson cycle showed improvement for all refrigerants other than R717 and R32, and the improvement rate for the COP and the refrigeration capacity becomes larger as the sp. heat ratio at the gas outlet point of the regenerative heat exchanger becomes smaller with the rate value differing according to the type of refrigerant.

ST vapor compression refrigeration Ericsson cycle performance characteristic

IT Thermodynamic cycle
(Ericsson; performance characteristics of vapor compression refrigeration cycle based on Ericsson cycle)

IT Compression
Refrigerants
Refrigeration
(performance characteristics of vapor compression refrigeration cycle based on Ericsson cycle)

IT 74-98-6, R290, uses 75-10-5, R32 75-28-5, R600a 75-45-6
354-33-6, R125 420-46-2, R143a 811-97-2, R134a
7664-41-7, R717, uses 133023-17-3, R410A 150621-87-7, R507A
150743-07-0, R404A 158675-78-6, R407C
RL: TEM (Technical or engineered material use); USES (Uses)
(performance characteristics of vapor compression refrigeration cycle based on Ericsson cycle)

L15 ANSWER 10 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2007:984772 CAPLUS
DN 147:346362
ED Entered STN: 05 Sep 2007
TI Heat transfer composition
IN Low, Robert Elliott; Corr, Stuart
PA Ineos Fluor Holdings Limited, UK
SO Brit. UK Pat. Appl., 44pp.
CODEN: BAXXDU
DT Patent
LA English
CC 48-5 (Unit Operations and Processes)
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	GB 2435747	A	20070905	GB 2006-19503	20061003
	DE 202007008291	U1	20071122	DE 2007-202007008291	20070613
	WO 2008009928	A2	20080124	WO 2007-GB2709	20070717
	WO 2008009928	A3	20080313		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA,
CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG,
KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL,
PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,
IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR, BF,
BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW,
GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,
BY, KG, KZ, MD, RU, TJ, TM, AP, EA, EP, OA

PRAI GB 2006-14067 A 20060717
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CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES

GB 2435747 IPCI C09K0005-04 [I,A]; C09K0005-00 [I,C*]; C09K0003-30 [I,A]
IPCR C09K0005-00 [I,C]; C09K0005-04 [I,A]; C09K0003-30 [I,C]; C09K0003-30 [I,A]
DE 202007008291 IPCI C09K0005-04 [I,A]; C09K0005-00 [I,C*]; C08J0009-14 [I,A]; C08J0009-00 [I,C*]; C08L0025-06 [I,A]; C08L0025-00 [I,C*]; C08L0063-00 [I,A]; C08L0075-04 [I,A]; C08L0075-00 [I,C*]; B29C0033-40 [I,A]; B29C0033-62 [I,A]; B29C0033-64 [I,A]; B29C0033-56 [I,C*]
WO 2008009928 IPCI C09K0005-04 [I,A]; C08J0009-14 [I,A]; C11D0007-50 [I,A]; C09K0005-00 [I,C]; C09K0005-04 [I,A]; C08J0009-00 [I,C]; C08J0009-14 [I,A]; C11D0007-50 [I,C]; C11D0007-50 [I,A]
IPCR C09K0005-00 [I,C]; C09K0005-04 [I,A]; C08J0009-00 [I,C]; C08J0009-14 [I,A]; C11D0007-50 [I,C]; C11D0007-50 [I,A]
ECLA C09K005/04B4B

AB Heat transfer compns. comprise (i) R-1225ye; (ii) at least one further refrigerant selected from carbon dioxide (R-744); fluoromethane (R-41); difluoromethane (R32); fluoroethane (R-161); 1,1,1 -trifluoroethane (R-143a); 1,1,1,2-tetrafluoroethane (R-134a); 1,1,2,2-tetrafluoroethane (R-134); dimethylether; heptafluoropropane (R-227ea); propane (R-290); propene (R-1270); isobutane (R-600a); n-butane (R-600) 2,3,3,3-tetrafluoropropene (R-1234yf); 1,1-difluorocyclopropane; 1,1,2-trifluorocyclopropane; 1,1,2,2-tetrafluorocyclopropane; pentafluorocyclopropane, pentafluoroethane (R-125) or ammonia. Further similar mixts. form the basis of preferred embodiments including compns. based on the isomer R-1225yeE and similar co-refrigerants in differing combinations. The compns. are used for conventional refrigeration applications such as automobile air conditioning or as aerosol propellants or in vapor phase heating or cooling applications.

ST refrigerant propellant heat transfer agent

IT Epoxy resins, miscellaneous
Polyurethanes, miscellaneous
RL: MSC (Miscellaneous)
(blowing agents for; heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Amines, uses
RL: MOA (Modifier or additive use); USES (Uses)
(bromofluoroalkyl and perfluoroalkyl; flame retardant; heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Hydrocarbons, uses
RL: MOA (Modifier or additive use); USES (Uses)
(fluorobromo and fluoroiodo derivs.; flame retardant; heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Aromatic compounds
RL: MOA (Modifier or additive use); USES (Uses)
(halogenated; flame retardants; heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

IT Air conditioning
Blowing agents
Freezers
Heat pumps
Heat transfer agents
Lubricating oils
Propellants (sprays and foams)
Refrigerants

Refrigerating apparatus
Solvent extraction
(heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)
IT Polyolefins
Polyoxyalkylenes, uses
Polysiloxanes, uses
RL: MOA (Modifier or additive use); USES (Uses)
(lubricants; heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)
IT Alcohols, uses
RL: MOA (Modifier or additive use); USES (Uses)
(polyhydric, esters, lubricants; heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)
IT Epoxides
Phenols, uses
Phosphates, uses
RL: MOA (Modifier or additive use); USES (Uses)
(stabilizers; heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)
IT Plastics, miscellaneous
RL: MSC (Miscellaneous)
(thermoplastics, blowing agents for; heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)
IT 5595-10-8, R 1225YeE
RL: MOA (Modifier or additive use); USES (Uses)
(HFC 1225yeE; heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)
IT 9003-53-6, Polystyrene
RL: MSC (Miscellaneous)
(blowing agents for; heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)
IT 115-96-8, Tri(2-chloroethyl) phosphate 126-72-7 1309-64-4, Antimony oxide, uses 2314-97-8, Trifluoroiodomethane 7664-38-2D, Phosphoric acid, Chloropropyl esters 7783-28-0, Diammonium phosphate 9002-86-2, Polyvinyl chloride 21645-51-2, Aluminum hydroxide (Al(OH)3), uses 40120-74-9
RL: MOA (Modifier or additive use); USES (Uses)
(flame retardant; heat transfer composition for use in refrigeration , as a blowing agent, as a propellant, and as an extraction solvent)
IT 74-98-6, Propane, uses 75-10-5, Difluoromethane 75-28-5, Isobutane 75-37-6, R-152a 106-97-8, n-Butane, uses 115-07-1, Propene, uses 115-10-6, Dimethyl ether 124-38-9, R-744, uses 353-36-6, Fluoroethane 354-33-6, R-125 359-35-3, 1,1,2,2-Tetrafluoroethane 420-46-2, 1,1,1-Trifluoroethane 558-29-2, 1,1-Difluorocyclopropane 593-53-3, R 41 754-12-1, 2,3,3,3-Tetrafluoropropene 811-97-2, 1,1,1,2-Tetrafluoroethane 872-58-2, Pentafluorocyclopropane 2252-84-8, Heptafluoropropane 3899-71-6, 1,1,2,2-Tetrafluorocyclopropane 3899-72-7, 1,1,2-Trifluorocyclopropane 7664-41-7, Ammonia, uses
RL: MOA (Modifier or additive use); USES (Uses)
(heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)
IT 2252-83-7, R 1225Ye
RL: TEM (Technical or engineered material use); USES (Uses)
(heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)
IT 71-43-2D, Benzene, alkyl derivs. 9003-19-4D, Polyvinyl ether, derivs
RL: MOA (Modifier or additive use); USES (Uses)

(lubricants; heat transfer composition for use in refrigeration, as a blowing agent, as a propellant, and as an extraction solvent)

RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Bowman; US 20070010592 A1 CAPLUS
(2) Dupont; WO 2006094303 A2 CAPLUS
(3) Minor; US 20060243944 A1 CAPLUS
(4) Pham; US 20040127383 A1 CAPLUS
(5) Pham; WO 2004037752 A2 CAPLUS
(6) Sievert; WO 2007053697 A2 CAPLUS
(7) Singh; US 20040119047 A1 CAPLUS
(8) Singh; US 20070007488 A1
(9) Singh; WO 2007002625 A2 CAPLUS
(10) Singh; US 7098176 B2 CAPLUS
(11) Wilson; US 20050022166 A1

L15 ANSWER 11 OF 175 CAPLUS

AN 2007:817217 CAPLUS
DN 147:167066
ED Entered STN: 27 Jul 2007
TI Thermoplastic block copolymer foam additives
IN Van Horn, Brett L.
PA Arkema Inc., USA
SO PCT Int. Appl., 15pp.
CODEN: PIXXD2
DT Patent
LA English
CC 37-2 (Plastics Manufacture and Processing)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2007084665	A2	20070726	WO 2007-US1436	20070118
	WO 2007084665	A3	20080124		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AP, EA, EP, OA

PRAI US 2006-760330P P 20060119

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2007084665	IPCI	C08K0005-02 [I,A]; C08K0005-00 [I,C*]; C08G0018-00 [I,C]; C08G0018-48 [I,A]
	IPCR	C08G0018-00 [I,C]; C08G0018-48 [I,A]
	ECLA	C08F293/00B; C08L053/00+B; C08L053/00+B2

AB The present invention provides an additive for thermoplastic polymer foams which provide for enlarged cell size or with decreased d. with minimal impact on the thermal mech. properties of the thermoplastic foam. The additive is an essentially block copolymer blowing agent compatibilizer. Including the additive in a thermoplastic foaming composition comprised of a thermoplastic polymer resin and a phys. blowing agent provides for the production of foam having enlarged cell size or with decreased d. and minimal impact on the thermal mech. properties of the thermoplastic foam. The block copolymer

compatibilizer has at least a first block having at least one functionality compatible with the thermoplastic resin and at least one second block having a functionality compatible with the blowing agent.

ST   thermoplastic block copolymer foam blowing

IT   Alkanes, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (Blowing agents; thermoplastic block copolymer foam additives)

IT   Blowing agents
     Polymer blend compatibilizers
        (thermoplastic block copolymer foam additives)

IT   Polymer blends
     RL: TEM (Technical or engineered material use); USES (Uses)
        (thermoplastic block copolymer foam additives)

IT   Plastic foams
     RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
        (thermoplastic; thermoplastic block copolymer foam additives)

IT   Plastics, uses
     RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
        (thermoplastics; thermoplastic block copolymer foam additives)

IT   75-10-5, Difluoromethane   75-37-6, 1,1-Difluoroethane   124-38-9, Carbon dioxide, uses 354-33-6, Pentafluoroethane   406-58-6, 1,1,1,3,3-Pentafluorobutane 420-46-2, 1,1,1-Trifluoroethane 430-66-0, 1,1,2-Trifluoroethane   431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane   460-73-1, 1,1,1,3,3-Pentafluoropropane 811-97-2, 1,1,1,2-Tetrafluoroethane
     RL: MOA (Modifier or additive use); USES (Uses)
        (Blowing agents; thermoplastic block copolymer foam additives)

IT   9003-53-6, Polystyrene   110772-34-4, Butyl acrylate-styrene block copolymer
     RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
        (thermoplastic block copolymer foam additives)

L15 ANSWER 12 OF 175 CAPLUS

AN   2007:505310 CAPLUS
DN   146:482964
ED   Entered STN: 10 May 2007
TI   Thermoplastic material for foamed articles
IN   Rauniyar, Govind; Snoeijers, Mariska; Koch-Suikerbuik, Nancy; Goodwin, Carl
PA   Neth.
SO   U.S. Pat. Appl. Publ., 10pp.
     CODEN: USXXCO
DT   Patent
LA   English
INCL 521056000
CC   38-3 (Plastics Fabrication and Uses)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 20070105967	A1	20070510	US 2005-268821	20051108
	CA 2627676	A1	20071025	CA 2006-2627676	20061018
	WO 2007119102	A2	20071025	WO 2006-IB3979	20061018
	WO 2007119102	A3	20071227		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD,

GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN,
KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, ME, MG,
MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT,
RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR,
TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,
IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ,
CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY,
KG, KZ, MD, RU, TJ, TM, AP, EA, EP, OA
EP 1951793 A2 20080806 EP 2006-850449 20061018
R: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,
IS, IT, LI, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR
PRAI US 2005-268821 A 20051108
WO 2006-IB3979 W 20061018
CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 20070105967	INCL	521056000
	IPCI	C08J0009-16 [I,A]; C08J0009-00 [I,C*]
	IPCR	C08J0009-00 [I,C]; C08J0009-16 [I,A]
	NCL	521/056.000
CA 2627676	IPCI	C08J0009-00 [I,A]; C08J0009-18 [I,A]
	IPCR	C08J0009-00 [I,C]; C08J0009-00 [I,A]; C08J0009-18 [I,A]
WO 2007119102	IPCI	C08J0009-00 [I,A]; C08J0009-18 [I,A]; C08J0009-00 [I,C]; C08J0009-00 [I,A]; C08J0009-18 [I,A]
EP 1951793	IPCI	C08J0009-00 [I,A]; C08J0009-18 [I,A]

AB The present invention provides a thermoplastic composition prepared by providing a mixture of ethylenically unsatd. monomers containing one or more styrenic monomers, one or more waxes, one or more white oils, and a particulate solid; polymerizing the monomers in the mixture in the presence of one or more free radical catalysts to form expandable particles; incorporating a blowing agent into the expandable particles; and at least partially expanding the expandable particles to provide expanded particles. Foamed articles can be prepared by feeding pre-expanded particles of the thermoplastic composition to a mold, heating the mold and expanded particles to a temperature sufficient to further expand the particles and cause the pre-expanded particles to soften and stick together, and cooling the mold to provide a foamed article.

ST foam thermoplastic wax oil catalyst blowing agent unsatd monomer

IT Polymerization
(suspension; thermoplastic material for foamed articles)

IT Blowing agents
Catalysts
Chars
Pigments, nonbiological
(thermoplastic material for foamed articles)

IT Carbon black, uses
Clays, uses
Coke
Diatomite
Polyesters, uses
Waxes
Zeolites (synthetic), uses
RL: MOA (Modifier or additive use); USES (Uses)
(thermoplastic material for foamed articles)

IT Plastic foams
RL: TEM (Technical or engineered material use); USES (Uses)
(thermoplastic material for foamed articles)

IT Hydrocarbon oils
Paraffin oils

RL: MOA (Modifier or additive use); USES (Uses)
   (white oils; thermoplastic material for foamed articles)
IT 74-82-8, Methane, uses 74-84-0, Ethane, uses 74-98-6, Propane, uses 75-10-5, Difluoromethane 75-37-6, 1,1-Difluoroethane 78-67-1, Azodiisobutyronitrile 80-17-1, Benzenesulfonylhydrazide 106-97-8, n-Butane, uses 123-77-3, Azodicarbonamide 124-38-9, Carbon dioxide, uses 133-55-1, N,N'-Dimethyl-n,n'-dinitrosoterephthalamide 287-92-3, Cyclopentane 359-35-3, 1,1,2,2-Tetrafluoroethane 460-73-1, 1,1,1,3,3-Pentafluoropropane 463-82-1, Neopentane 811-97-2, 1,1,1,2-Tetrafluoroethane 2551-62-4, Sulfur hexafluoride 3955-25-7, Barium azodicarboxylate 7440-37-1, Argon, uses 7727-37-9, Nitrogen, uses 10105-42-7, Trihydrazino triazine
RL: NUU (Other use, unclassified); USES (Uses)
   (blowing agent; thermoplastic material for foamed articles)
IT 471-34-1, Calcium carbonate, uses 1309-48-4, Magnesium oxide, uses 1314-23-4, Zirconium oxide, uses 1344-28-1, Aluminum oxide, uses 7429-90-5, Aluminum, uses 7440-67-7, Zirconium, uses 7631-86-9, Silica, uses 7727-43-7, Barium sulphate 7778-18-9, Calcium sulphate 7782-40-3, Diamond dust, uses 7782-42-5, Graphite, uses 13463-67-7, Titanium dioxide, uses 14807-96-6, Talc, uses
RL: MOA (Modifier or additive use); USES (Uses)
   (thermoplastic material for foamed articles)
IT 75-28-5, Isobutane 78-78-4, Isopentane 109-66-0, Pentane, uses 353-36-6, Fluoroethane 354-33-6, Pentafluoro ethane 420-46-2, 1,1,1-Trifluoroethane
RL: NUU (Other use, unclassified); USES (Uses)
   (thermoplastic material for foamed articles)
IT 9003-53-6, Polystyrene
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
   (thermoplastic material for foamed articles)
IT 9002-88-4, Polyethylene 9003-07-0, Polypropylene
RL: MOA (Modifier or additive use); USES (Uses)
   (wax; thermoplastic material for foamed articles)

L15 ANSWER 13 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2006:1202449 CAPLUS
DN 145:506638
ED Entered STN: 16 Nov 2006
TI Expandable resin beads with good toughness and cushioning properties
IN Petela, Grazyna; Berghmans, Michel Florentine Jozef; Bleijenberg, Karel Cornelis
PA Nova Chemicals Inc., USA
SO PCT Int. Appl., 97pp.
CODEN: PIXXD2
DT Patent
LA English
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 39
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2006122185	A2	20061116	WO 2006-US18075	20060510
	WO 2006122185	A3	20070419		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,

IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AP, EA, EP, OA

US 20060276558	A1	20061207	US 2006-430797	20060509
AU 2006244012	A1	20061116	AU 2006-244012	20060510
CA 2606144	A1	20061116	CA 2006-2606144	20060510
EP 1885778	A2	20080213	EP 2006-759487	20060510
R: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LI, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR				
MX 200713883	A	20080124	MX 2007-13883	20071106
IN 2007KN04285	A	20080509	IN 2007-KN4285	20071107
KR 2008016622	A	20080221	KR 2007-728720	20071207
PRAI US 2005-679468P	P	20050510		
WO 2006-US18075	W	20060510		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2006122185	IPCI	C08J0009-16 [I,A]; C08J0009-00 [I,C]; C08J0009-16 [I,A]; C08F0012-00 [I,C]; C08F0012-08 [I,A]; C08F0212-00 [I,C]; C08F0212-08 [I,A]
	IPCR	C08J0009-00 [I,C]; C08J0009-16 [I,A]; C08F0012-00 [I,C]; C08F0012-08 [I,A]; C08F0212-00 [I,C]; C08F0212-08 [I,A]
	ECLA	C08J009/00L25+L53/00; C08J009/18+L53/00
US 20060276558	IPCI	C08J0009-16 [I,A]; C08J0009-00 [I,C*]
	IPCR	C08J0009-00 [I,C]; C08J0009-16 [I,A]
	NCL	521/056.000
AU 2006244012	IPCI	C08J0009-00 [I,C]; C08J0009-16 [I,A]; C08F0012-00 [I,C]; C08F0012-08 [I,A]; C08F0212-00 [I,C]; C08F0212-08 [I,A]
	IPCR	C08J0009-00 [I,C]; C08J0009-16 [I,A]; C08F0012-00 [I,C]; C08F0012-08 [I,A]; C08F0212-00 [I,C]; C08F0212-08 [I,A]
	ECLA	C08J009/00L25+L53/00; C08J009/18+L53/00
CA 2606144	IPCI	C08F0012-08 [I,A]; C08F0012-00 [I,C*]; C08F0212-08 [I,A]; C08F0212-00 [I,C*]; C08J0009-16 [I,A]; C08J0009-00 [I,C*]
	IPCR	C08J0009-00 [I,C]; C08J0009-16 [I,A]; C08F0012-00 [I,C]; C08F0012-08 [I,A]; C08F0212-00 [I,C]; C08F0212-08 [I,A]
EP 1885778	IPCI	C08J0009-16 [I,A]; C08J0009-00 [I,C*]; C08F0212-08 [I,A]; C08F0212-00 [I,C*]; C08F0012-08 [I,A]; C08F0012-00 [I,C*]
	IPCR	C08J0009-00 [I,C]; C08J0009-16 [I,A]; C08F0012-00 [I,C]; C08F0012-08 [I,A]; C08F0212-00 [I,C]; C08F0212-08 [I,A]
MX 200713883	IPCI	C08J0009-16 [I,A]; C08J0009-00 [I,C*]; C08F0012-08 [I,A]; C08F0012-00 [I,C*]; C08F0212-08 [I,A]; C08F0212-00 [I,C*]
IN 2007KN04285	IPCI	C08J0009-16 [ICM,7]; C08J0009-00 [ICM,7,C*]
KR 2008016622	IPCI	C08J0009-16 [I,A]; C08J0009-00 [I,C*]; C08F0012-08 [I,A]; C08F0012-00 [I,C*]; C08F0212-08 [I,A]; C08F0212-00 [I,C*]

AB Resin beads having an average particle size of from 0.001 mm to 10 mm and containing a continuous phase and a particulate dispersed phase are described. The continuous phase includes elastomeric polymers; the dispersed phase includes homopolymers and/or copolymers containing repeat units resulting from the polymerization of one or more aryl polymerizable monomers. The unexpanded polymer resin beads can be prepared by dispersing an organic phase containing elastomeric polymers and one or more monomers, into droplets and polymerizing the monomers in the organic droplets in a low shear flow pattern. The beads

can be impregnated with blowing agents, expanded and can be used to make
molded articles. Resin beads having a continuous phase comprising a
nitrile rubber, and a dispersed phase comprising one or more homopolymers
and/or copolymers containing repeat units resulting form the polymerization of
one or
more aryl polymerizable show prolonged retention of blowing agents in
unexpanded form.

ST nitrile rubber polymer expanded bead manuf; dispersion polymn expanded
bead manuf; blowing agent expanded resin bead manuf

IT Spheres
(beads; manufacture of expandable resin beads containing polymers prepared
in the
presence of rubber)

IT Isoprene-styrene rubber
Styrene-butadiene rubber, uses
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or
engineered material use); USES (Uses)
(block, diblock; manufacture of expandable resin beads containing polymers
prepared in the presence of rubber)

IT Isoprene-styrene rubber
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or
engineered material use); USES (Uses)
(block, triblock, hydrogenated; manufacture of expandable resin beads
containing
polymers prepared in the presence of rubber)

IT Styrene-butadiene rubber, uses
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or
engineered material use); USES (Uses)
(block, triblock; manufacture of expandable resin beads containing polymers
prepared in the presence of rubber)

IT Surfactants
(dispersants; manufacture of expandable resin beads containing polymers
prepared
in the presence of rubber)

IT Bentonite, uses
Gelatins, uses
RL: MOA (Modifier or additive use); USES (Uses)
(dispersants; manufacture of expandable resin beads containing polymers
prepared
in the presence of rubber)

IT Blowing agents
(manufacture of expandable resin beads containing polymers prepared in the
presence of rubber)

IT Ethylene-vinyl acetate rubber
Nitrile rubber, uses
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or
engineered material use); USES (Uses)
(manufacture of expandable resin beads containing polymers prepared in the
presence of rubber)

IT Plastic foams
Polymer blends
RL: PRP (Properties); TEM (Technical or engineered material use); USES
(Uses)
(manufacture of expandable resin beads containing polymers prepared in the
presence of rubber)

IT Butadiene rubber, uses
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or
engineered material use); USES (Uses)
(of cis-1,4-configuration, continuous phase; Diene 55AC10; manufacture of
expandable resin beads containing polymers prepared in the presence of
rubber)

IT 78-78-4, Isopentane 109-66-0, Pentane, uses

RL: NUU (Other use, unclassified); USES (Uses)
(blowing agent; manufacture of expandable resin beads containing polymers
prepared
in the presence of rubber)
IT 74-82-8, Methane, uses 74-84-0, Ethane, uses 74-98-6, Propane, uses
75-10-5, HFC-32 75-28-5, Isobutane 75-37-6, HFC-152a
78-67-1, Azodiisobutyronitrile 80-17-1, Benzenesulfonylhydrazide
106-97-8, n-Butane, uses 110-54-3, Hexane, uses 123-77-3,
Azodicarbonamide 124-38-9, Carbon dioxide, uses 133-55-1,
N,N'-Dimethyl-N,N'-dinitrosoterephthalamide 287-92-3, Cyclopentane
353-36-6, HFC-161 354-33-6, HFC-125 359-35-3, HFC-134
420-46-2, HFC 143a 460-73-1, 1,1,1,3,3-Pentafluoropropane
463-82-1, Neopentane 811-97-2, HFC-134a 2551-62-4 3955-25-7,
Barium azodicarboxylate 7440-37-1, Argon, uses 7727-37-9, Nitrogen,
uses 10105-42-7, Trihydrazinotriazine 10195-67-2, 4,4'-
Oxybis(benzenesulfonyl semicarbazide) 10396-10-8, p-Toluene sulfonyl
semicarbazide
RL: NUU (Other use, unclassified); USES (Uses)
(blowing agents; manufacture of expandable resin beads containing polymers
prepared in the presence of rubber)
IT 9003-17-2D, of cis-1,4-configuration
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or
engineered material use); USES (Uses)
(butadiene rubber, continuous phase; Diene 55AC10; manufacture of expandable
resin beads containing polymers prepared in the presence of rubber)
IT 1343-88-0, Magnesium silicate 1344-28-1, Alumina, uses 5039-78-1D,
Methacryloyloxyethyltrimethylammonium chloride, copolymer 9002-18-0,
Agar 9002-89-5, Poly(vinyl alcohol) 9003-05-8, Polyacrylamide
9003-43-4, Polyvinylpyrrolidine 9004-32-4, Carboxymethyl cellulose
26062-79-3, Dimethyldiallylammonium chloride polymer 26161-33-1,
Methacryloyloxyethyltrimethylammonium chloride homopolymer 26427-01-0,
Acrylamidopropyltrimethylammonium chloride homopolymer 27103-90-8,
Poly(methacryloyloxyethyltrimethylammonium methyl sulfate) 33114-26-0,
Poly(acryloyloxyethyltrimethylammonium methyl sulfate) 44992-01-0D,
Acryloyloxyethyltrimethylammonium chloride, copolymer 45021-77-0D,
Acrylamidopropyltrimethylammonium chloride, copolymer 51410-72-1D,
copolymer 68039-13-4, Methacrylamidopropyltrimethylammonium chloride
homopolymer
RL: MOA (Modifier or additive use); USES (Uses)
(dispersants; manufacture of expandable resin beads containing polymers
prepared
in the presence of rubber)
IT 9003-53-6P, Polystyrene
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP
(Properties); TEM (Technical or engineered material use); PREP
(Preparation); USES (Uses)
(dispersed phase; manufacture of expandable resin beads containing polymers
prepared in the presence of rubber)
IT 700836-36-8D, block, triblock
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or
engineered material use); USES (Uses)
(isoprene-styrene rubber, hydrogenated; manufacture of expandable resin
beads containing polymers prepared in the presence of rubber)
IT 694523-05-2D, block, diblock
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or
engineered material use); USES (Uses)
(isoprene-styrene rubber; manufacture of expandable resin beads containing
polymers prepared in the presence of rubber)
IT 144-55-8, Sodium bicarbonate, uses
RL: NUU (Other use, unclassified); USES (Uses)
(manufacture of expandable resin beads containing polymers prepared in the
presence of rubber)

IT 9003-18-3
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(nitrile rubber; manufacture of expandable resin beads containing polymers prepared in the presence of rubber)
IT 24937-78-8, Ethylene-vinyl acetate copolymer
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(rubber; manufacture of expandable resin beads containing polymers prepared in the
presence of rubber)
IT 694491-73-1D, block, triblock 709030-54-6D, block, diblock
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(styrene-butadiene rubber; manufacture of expandable resin beads containing polymers prepared in the presence of rubber)

L15 ANSWER 14 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2006:1150221 CAPLUS
DN 145:473771
ED Entered STN: 02 Nov 2006
TI Fluoroolefin-based fluorocarbon-hydrocarbon mixtures as working fluids, heat transfer agents, and fire extinguishers
IN Minor, Barbara Haviland; Rao, Velliyur Nott Mallikarjuna; Bivens, Donald Bernard; Perti, Deepak; Baunchalk, Mark Steven
PA USA
SO U.S. Pat. Appl. Publ., 77pp., Cont.-in-part of U.S. Ser. No. 369,227.
CODEN: USXXCO
DT Patent
LA English
INCL 252067000
CC 48-5 (Unit Operations and Processes)
FAN.CNT 4

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 20060243945	A1	20061102	US 2006-393109	20060330
	US 20060243944	A1	20061102	US 2006-369227	20060302
	WO 2007126414	A2	20071108	WO 2006-US33674	20060829
	WO 2007126414	A3	20080124		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AP, EA, EP, OA

PRAI	US 2005-658543P	P	20050304
	US 2005-710439P	P	20050823
	US 2005-732769P	P	20051101
	US 2006-369227	A2	20060302
	US 2006-393109	A	20060330
	US 2006-486791	A	20060713

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 20060243945	INCL	252067000
	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]

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                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]
                 NCL    252/067.000
                 ECLA   C09K005/04B4B
 US 20060243944  IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,C*]
                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]
                 NCL    252/067.000
                 ECLA   C09K005/04B4B
 WO 2007126414   IPCI   C09K0003-30 [I,A]; C09K0005-04 [I,A]; A62D0001-00
                        [I,A]; C08J0009-00 [I,A]; C09K0003-30 [I,C];
                        C09K0003-30 [I,A]; A62D0001-00 [I,C]; A62D0001-00
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                        C09K0005-00 [I,C]; C09K0005-04 [I,A]
                 IPCR   C09K0003-30 [I,C]; C09K0003-30 [I,A]; A62D0001-00
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                        C08J0009-00 [I,A]; C09K0005-00 [I,C]; C09K0005-04 [I,A]
                 ECLA   C09K005/04B4B; C09K003/30
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OS   MARPAT 145:473771

AB   Fluoroolefin-containing compns. consist of HFC-1225ye (1,2,3,3,3-pentafluoropropene) and ≥1 of HFC-1234ze (cis- and trans-1,3,3,3-tetrafluoropropene), HFC-1234yf (2,3,3,3-tetrafluoropropene), HFC-1234ye (1,2,3,3-tetrafluoropropene), HFC-1243zf (3,3,3-trifluoropropene), HFC-32, HFC-125, HFC-134, HFC-134a, HFC-143a, HFC-152a, HFC-161, HFC-227ea, HFC-236ea, HFC-236fa, HFC-245fa, HFC-365mfc, propane, n-butane, isobutane, 2-methylbutane, n-pentane, cyclopentane, di-Me ether, bis(trifluoromethyl) sulfide (CF3SCF3), CO2, ammonia, and CF3I. The compns. can also include such components as compatibilizers, solubilizers, stabilizers, tracers, UV fluorescent dyes, water scavengers, and odor masking agents. The compns. are especially useful as refrigerants (e.g., for air conditioners), heat transfer fluids (e.g., for heat pumps), blowing agents, foaming agents, aerosol propellants, and fire extinguishers.

ST   fluoroalkene working fluid refrigerant heat transfer fluod; fluoropropene blowing agent fire extinguisher; aerosol propellant fluoropropene working fluid

IT   Ethers, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (aromatic, working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)

IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (chloro, working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)

IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (deuterated, tracers, working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)

IT   Polyoxyalkylenes, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (ethers, working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)

IT   Alkenes, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro, fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)

IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro, tracers, working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer

agents, and fire extinguishers)
IT Alkanes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoro, working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)
IT Ethers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoroalkyl, working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)
IT Blowing agents
Fire extinguishers
Foaming agents
Heat transfer agents
Propellants (sprays and foams)
Refrigerants
(fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)
IT Phenols, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(hindered, stabilizers, working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)
IT Hydroxylamines
Phosphites
Thiols, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(stabilizers, working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)
IT Alcohols, uses
Aldehydes, uses
Perfluorocarbons
RL: TEM (Technical or engineered material use); USES (Uses)
(tracers, working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)
IT Fluorescent dyes
Solubilizers
Stabilizing agents
Tracers
(working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)
IT Amides, uses
Esters, uses
Ketones, uses
Lactones
Nitriles, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)
IT Air conditioning
Heat pumps
Lubricating oils
(working fluids for; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)
IT 81-83-4D, Naphthalimide, derivs. 85-01-8D, Phenanthrene, derivs. 91-64-5D, Coumarin, derivs. 92-83-1D, Xanthene, derivs. 120-12-7D, Anthracene, derivs. 198-55-0D, Perylene, derivs. 261-31-4D, Thioxanthene, derivs. 2321-07-5D, Fluorescein, derivs.
RL: TEM (Technical or engineered material use); USES (Uses)

(fluorescent dyes, working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)

IT 75-52-5, Nitromethane, uses 7803-49-8D, Hydroxylamine, derivs.
RL: TEM (Technical or engineered material use); USES (Uses)
(stabilizers, working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)

IT 64-17-5, Ethanol, uses 67-63-0, Isopropanol, uses 67-64-1, Acetone, uses 71-23-8, n-Propanol, uses 74-83-9, Bromomethane, uses 74-96-4, Ethyl bromide 75-25-2, Tribromomethane 75-46-7, Trifluoromethane 76-16-4, Perfluoroethane 76-19-7, Perfluoropropane 78-93-3, Methyl ethyl ketone, uses 106-93-4, 1,2-Dibromoethane 115-25-3, Perfluorocyclobutane 123-38-6, n-Propanal, uses 123-72-8, n-Butanal 306-98-9, Perfluoro-1,2-dimethylcyclohexane 335-21-7 335-27-3, Perfluoro-1,3-dimethylcyclohexane 354-41-6 354-65-4, 1,2-Diiodo-1,1,2,2-tetrafluoroethane 354-92-7, Perfluoroisobutane 355-02-2, Perfluoromethylcyclohexane 355-25-9, Perfluorobutane 358-99-6, 1-Bromo-1,2-difluoroethylene 373-52-4, Bromofluoromethane 373-53-5, Fluoroiodomethane 374-77-6, Perfluoro-1,4-dimethylcyclohexane 375-17-7, 1,1,1,2,2,3,3,4,4-Nonafluorobutane 377-36-6, 1,1,2,2,3,3,4,4-Octafluorobutane 382-24-1, 2-(Trifluoromethyl)-1,1,1,3,3,3-hexafluoropropane 420-26-8, 2-Fluoropropane 420-45-1, 2,2-Difluoropropane 421-07-8, 1,1,1-Trifluoropropane 421-14-7 421-48-7, 1,1,1,2-Tetrafluoropropane 423-02-9, Perfluoroisopropylcyclohexane 460-13-9, 1-Fluoropropane 558-59-8 591-50-4, Phenyl iodide 593-60-2, Bromoethylene 594-24-1 662-00-0, 1,1,1,2,2,3,3-Heptafluorobutane 662-02-2 677-56-5, 1,1,1,2,2,3,-Hexafluoropropane 931-91-9, Perfluorocyclopropane 1493-03-4, Difluoroiodomethane 1511-62-2, Bromodifluoromethane 1583-97-7 1583-98-8 1632-99-1, Hexadeuteroethane 1736-47-6, Perfluoroindan 1805-22-7, Perfluoromethylcyclopentane 1814-88-6, 1,1,1,2,2-Pentafluoropropane 1868-53-7, Dibromofluoromethane 1885-48-9 2252-84-8, 1,1,1,2,2,3,3-Heptafluoropropane 2261-01-0 2356-62-9, Trifluoromethyl 1,2,2,2-tetrafluoroethyl ether 2875-94-7, Perdeuteropropane 2924-29-0, 1,1,1,2,2,4,4,4-Octafluorobutane 3330-14-1 3330-15-2 3822-68-2 7370-99-2 7371-43-9 10024-97-2, Nitrous oxide, uses 13221-71-1 20705-05-9 22410-44-2 38878-30-7 40723-63-5, 1,1,2,2-Tetrafluoropropane 51294-16-7 60433-11-6, cis-Perfluorodecalin 60433-12-7, trans-Perfluorodecalin 69948-27-2 72256-43-0 73196-05-1 84011-15-4 87458-21-7 119117-94-1 138495-42-8, 1,1,1,2,2,3,4,5,5,5-Decafluoropentane 274689-13-3 496024-52-3
RL: TEM (Technical or engineered material use); USES (Uses)
(tracer, working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon mixts. as working fluids, heat transfer agents, and fire extinguishers)

IT 74-98-6, Propane, uses 75-10-5, HFC-32 75-28-5, Isobutane 75-37-6, HFC-152a 78-78-4, 2-Methylbutane 106-97-8, n-Butane, uses 109-66-0, n-Pentane, uses 115-10-6, Dimethyl ether 124-38-9, Carbon dioxide, uses 287-92-3, Cyclopentane 353-36-6, HFC-161 354-33-6, HFC-125 359-35-3, HFC-134 371-78-8, Bis(trifluoromethyl) sulfide 406-58-6, HFC-365mfc 420-46-2, HFC-143a 431-63-0, HFC-236ea 431-89-0, HFC-227ea 460-73-1, HFC-245fa 677-21-4, 3,3,3-Trifluoropropene 690-39-1, HFC-236fa 754-12-1, 2,3,3,3-Tetrafluoropropene 811-97-2, HFC-134a 1645-83-6, 1,3,3,3-Tetrafluoropropene 2252-83-7, 1,2,3,3,3-Pentafluoropropene 2314-97-8, Trifluoroiodomethane 7125-86-2 7664-41-7, Ammonia, uses 29118-24-9, trans-1,3,3,3-Tetrafluoropropene 29118-25-0, cis-1,3,3,3-Tetrafluoropropene
RL: TEM (Technical or engineered material use); USES (Uses)
(working fluids containing; fluoroolefin-based fluorocarbon-hydrocarbon

mixts. as working fluids, heat transfer agents, and fire extinguishers)

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L15  ANSWER 15 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2006:917627  CAPLUS
DN   145:317314
ED   Entered STN:  08 Sep 2006
TI   Low-ozone-depletion and low-global-warming-potential working fluids
     containing C3-fluoroolefins
IN   Minor, Barbara Haviland; Rao, Velliyur Nott Mallikarjuna; Bivens, Donald
     Bernard; Perti, Deepak
PA   E.I. Dupont de Nemours and Company, USA
SO   PCT Int. Appl., 177 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
CC   48-5 (Unit Operations and Processes)
FAN.CNT 4
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
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PI   WO 2006094303        A2    20060908    WO 2006-US8164         20060303
     WO 2006094303        A3    20070621
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             GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR,
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     AU 2006218376        A1    20060908    AU 2006-218376         20060303
     CA 2600319           A1    20060908    CA 2006-2600319        20060303
     EP 1853679           A2    20071114    EP 2006-737345         20060303
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     JP 2008531836        T     20080814    JP 2007-558341         20060303
     MX 200710758         A     20070914    MX 2007-10758          20070903
     IN 2007DN06834       A     20070921    IN 2007-DN6834         20070903
     KR 2007121708        A     20071227    KR 2007-722509         20071002
     NO 2007004989        A     20071107    NO 2007-4989           20071003
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     US 2005-710439P      P     20050823
     US 2005-732769P      P     20051101
     US 2006-369227       A     20060302
     WO 2006-US8164       W     20060303
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 WO 2006094303   IPCI   C09K0005-04 [I,A]; C09K0003-30 [I,A]; C08J0009-14
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                        C08J0009-14 [I,A]; C09K0003-30 [I,C]; C09K0003-30
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                        M10M; M10M; M10M; M10M; M10M; M10M; M10N; M10N
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                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]
                 NCL    252/067.000
                 ECLA   C09K005/04B4B
 AU 2006218376   IPCI   C09K0005-00 [I,C]; C09K0005-04 [I,A]; A62D0001-00
                        [I,C]; A62D0001-00 [I,A]; C08J0009-00 [I,C];
                        C08J0009-14 [I,A]; C09K0003-30 [I,C]; C09K0003-30
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                        C08J0009-14 [I,A]; C09K0003-30 [I,C]; C09K0003-30
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                 ECLA   C08J009/14P; C09K003/30; C09K005/04B4B; C10M171/00R;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10N; M10N
 CA 2600319      IPCI   A62D0001-00 [I,A]; C08J0009-14 [I,A]; C08J0009-00
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                        C09K0005-00 [I,C*]; C10M0171-00 [I,A]
                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]; A62D0001-00
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                        C08J0009-14 [I,A]; C09K0003-30 [I,C]; C09K0003-30
                        [I,A]; C10M0171-00 [I,C]; C10M0171-00 [I,A]
 EP 1853679      IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,C*]; C09K0003-30
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                        [I,C]; C08J0009-14 [I,A]; C09K0003-30 [I,C];
                        C09K0003-30 [I,A]
 JP 2008531836   IPCI   C09K0005-04 [I,A]; F25B0001-00 [I,A]; F25B0049-02
                        [I,A]; C09K0005-08 [I,A]; C09K0005-00 [I,C*];
                        C09K0003-30 [I,A]; C10M0105-38 [I,A]; C10M0105-06
                        [I,A]; C10M0105-04 [I,A]; C10M0105-00 [I,C*];
                        C10M0107-34 [I,A]; C10M0107-24 [I,A]; C10M0107-00
                        [I,C*]; C10M0101-02 [I,A]; C10M0101-00 [I,C*];
                        C10M0131-04 [I,A]; C10M0131-00 [I,C*]; A62D0001-08
                        [I,A]; A62D0001-00 [I,C*]
                 FTERM  2E191/AA06; 2E191/AA10; 2E191/AA18; 2E191/AB02;
                        4H104/BA02A; 4H104/BA04A; 4H104/BA07A; 4H104/BB34A;
                        4H104/BD01C; 4H104/CB02A; 4H104/CB14A; 4H104/DA02A;
                        4H104/LA11; 4H104/PA20
 MX 200710758    IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,C*]; A62D0001-00
                        [I,A]; C08J0009-14 [I,A]; C08J0009-00 [I,C*];
                        C09K0003-30 [I,A]; C10M0171-00 [I,A]
 IN 2007DN06834  IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
 KR 2007121708   IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,C*]; C09K0003-30
                        [I,A]
 NO 2007004989   IPCI   C09K0005-00 [I,C]; C09K0005-04 [I,A]; C08J0009-00
                        [I,C]; C08J0009-14 [I,A]; C09K0003-30 [I,C];
                        C09K0003-30 [I,A]
                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]; C08J0009-00
                        [I,C]; C08J0009-14 [I,A]; C09K0003-30 [I,C];
                        C09K0003-30 [I,A]
                 ECLA   C08J009/14P; C09K003/30; C09K005/04B4B; C10M171/00R;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10N; M10N
OS   MARPAT 145:317314
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AB Replacement working fluids with low or zero ozone-depletion potential and lower global warming potential contain ≥1 C3-fluoroolefin(s) in addition to other low ozone-depletion [non-perfluorocarbon] fluids. The compns., which can be present as azeotropes, are useful as heat transfer fluids, working fluids (e.g., for cooling or heating), foam blowing agents, aerosol propellants, and fire suppression and fire extinguishing agents. The C3-fluoropropenes include HFC-1225ye

(1,2,3,3,3-pentafluoropropene), HFC-1234ze (1,3,3,3-tetrafluoropropene), HFC-1234yf (2,3,3,3-tetrafluoropropene), HFC-1234ye (1,2,3,3-tetrafluoropropene), and HFC-1243zf (3,3,3-trifluoropropene).

ST heat transfer fluid fluoropropene; working fluid blowing agent fluoropropene; spray propellant fire extinguisher fluoropropene; azeotropy working fluid fluoropropene

IT Ethers, uses
RL: NUU (Other use, unclassified); USES (Uses)
(aromatic, compatibilizers, for fluoropropene-based working fluids and refrigerants; low-ozone-depletion and low-global-warming-potential working fluids containing C3-fluoroolefins)

IT Alkyl chlorides
Amides, uses
Esters, uses
Ketones, uses
Lactones
Nitriles, uses
RL: NUU (Other use, unclassified); USES (Uses)
(compatibilizers, for fluoropropene-based working fluids and refrigerants; low-ozone-depletion and low-global-warming-potential working fluids containing C3-fluoroolefins)

IT Fluorescent dyes
(dyes, for fluoropropene-based working fluids and refrigerants; low-ozone-depletion and low-global-warming-potential working fluids containing C3-fluoroolefins)

IT Polyoxyalkylenes, uses
RL: NUU (Other use, unclassified); USES (Uses)
(ethers, compatibilizers, for fluoropropene-based working fluids and refrigerants; low-ozone-depletion and low-global-warming-potential working fluids containing C3-fluoroolefins)

IT Alkanes, uses
RL: NUU (Other use, unclassified); USES (Uses)
(fluoro, 1,1,1-trifluoroalkanes, compatibilizers, for fluoropropene-based working fluids and refrigerants; low-ozone-depletion and low-global-warming-potential working fluids containing C3-fluoroolefins)

IT Hydrocarbons, uses
RL: NUU (Other use, unclassified); USES (Uses)
(fluoro, tracers, for fluoropropene-based working fluids and refrigerants; low-ozone-depletion and low-global-warming-potential working fluids containing C3-fluoroolefins)

IT Ethers, uses
RL: NUU (Other use, unclassified); USES (Uses)
(fluoroalkyl, compatibilizers, for fluoropropene-based working fluids and refrigerants; low-ozone-depletion and low-global-warming-potential working fluids containing C3-fluoroolefins)

IT Azeotropes
Blowing agents
Fire extinguishers
Fireproofing agents
Heat transfer agents
Propellants (sprays and foams)
Refrigerants
(low-ozone-depletion and low-global-warming-potential working fluids containing C3-fluoroolefins)

IT Flammability
(of fluoropropene-based working fluids and refrigerants; low-ozone-depletion and low-global-warming-potential working fluids containing C3-fluoroolefins)

IT 74-98-6, Propane, uses 75-10-5, HFC-32 75-28-5, Isobutane 78-78-4, 2-Methylbutane 106-97-8, n-Butane, uses 109-66-0, n-Pentane, uses 115-10-6, Dimethyl ether 124-38-9, Carbon dioxide, uses

287-92-3, Cyclopentane 354-33-6, R 125   371-78-8,
Bis(trifluoromethyl) sulfide   406-58-6, R 365Mfc 420-46-2, R
143a 811-97-2, R 134a   29118-24-9   29118-25-0
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoropropene-based working fluids containing; low-ozone-depletion and
low-global-warming-potential working fluids containing C3-fluoroolefins)

IT   75-37-6, R 152a   353-36-6, R 161   359-35-3, R 134   431-63-0, R 236Ea
431-89-0, R 227Ea   460-73-1, R 245Fa   690-39-1, R 236Fa   2314-97-8,
Trifluoromethyl iodide
RL: TEM (Technical or engineered material use); USES (Uses)
(tracer and fluoropropene-based working fluids containing;
low-ozone-depletion and low-global-warming-potential working fluids
containing C3-fluoroolefins)

IT   64-17-5, Ethanol, uses   67-63-0, Isopropanol, uses   67-64-1, Acetone,
uses   71-23-8, n-Propanol, uses   74-83-9, Methyl bromide, uses
74-96-4, Ethyl bromide   75-25-2, Tribromomethane   75-46-7,
Trifluoromethane   76-16-4, Perfluoroethane   76-19-7, Perfluoropropane
78-93-3, Methyl ethyl ketone, uses   106-93-4, 1,2-Dibromoethane
115-25-3, Perfluorocyclobutane   123-38-6, n-Propanal, uses   123-72-8,
n-Butanal   306-98-9   335-21-7   335-27-3   354-41-6,
1,1,2,2-Tetrafluoroiodoethane   354-65-4   354-92-7, Perfluoroisobutane
355-02-2, Perfluoromethylcyclohexane   355-25-9, Perfluorobutane
358-99-6   373-52-4, Bromofluoromethane   373-53-5, Fluoroiodomethane
374-77-6   375-17-7   377-36-6, 1,1,2,2,3,3,4,4-Octafluorobutane
382-24-1   420-26-8, 2-Fluoropropane   420-45-1, 2,2-Difluoropropane
421-07-8, 1,1,1-Trifluoropropane   421-14-7   421-48-7,
1,1,1,2-Tetrafluoropropane   423-02-9, Perfluoroisopropylcyclohexane
460-13-9, 1-Fluoropropane   558-59-8   591-50-4, Phenyl iodide   593-60-2,
Bromoethene   594-24-1   662-00-0, 1,1,1,2,2,3,3-Heptafluorobutane
662-02-2   677-56-5   931-91-9   1493-03-4, Difluoroiodomethane
1511-62-2, Bromodifluoromethane   1583-97-7   1583-98-8   1632-99-1,
Ethane-d6   1736-47-6, Perfluoroindane   1805-22-7,
Perfluoromethylcyclopentane   1814-88-6, 1,1,1,2,2-Pentafluoropropane
1868-53-7, Dibromofluoromethane   1885-48-9   2252-84-8,
1,1,2,2,3,3,3-Heptafluoropropane   2261-01-0   2356-62-9, Trifluoromethyl
1,2,2,2-tetrafluoroethyl ether   2875-94-7, Perdeuteropropane   2924-29-0
3330-15-2   3822-68-2   7370-99-2   10024-97-2, Nitrous oxide, uses
13221-71-1   20193-67-3   20705-05-9, 1,1,2-Trifluoro-1-iodoethane
22410-44-2, Methyl pentafluoroethyl ether   38878-30-7   40723-63-5,
1,1,2,2-Tetrafluoropropane   60433-11-6, cis-Perfluorodecalin
60433-12-7, trans-Perfluorodecalin   66804-94-2   69948-27-2   72256-43-0
73196-05-1   84011-15-4   87458-21-7   119117-94-1   138495-42-8,
1,1,1,2,3,4,4,5,5,5-Decafluoropentane   274689-13-3   496024-52-3
909248-99-3   909249-00-9
RL: NUU (Other use, unclassified); USES (Uses)
(tracers, for fluoropropene-based working fluids and refrigerants;
low-ozone-depletion and low-global-warming-potential working fluids
containing C3-fluoroolefins)

IT   115-07-1D, Propene, fluoro derivs.   677-21-4, 3,3,3-Trifluoropropene
754-12-1, 2,3,3,3-Tetrafluoropropene   1645-83-6, 1,3,3,3-
Tetrafluoropropene   2252-83-7, 1,2,3,3,3-Pentafluoropropene   7125-86-2
RL: TEM (Technical or engineered material use); USES (Uses)
(working fluids containing; low-ozone-depletion and low-global-warming-
potential working fluids containing C3-fluoroolefins)

L15   ANSWER 16 OF 175 CAPLUS

AN   2006:790634 CAPLUS

DN   145:213529

ED   Entered STN: 10 Aug 2006

TI   Absorption cycle utilizing ionic liquid as working fluid

IN   Shiflett, Mark Brandon; Yokozeki, Akimichi

PA   E.I. Dupont De Nemours and Company, USA

SO PCT Int. Appl., 154pp.
CODEN: PIXXD2
DT Patent
LA English
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 27, 28
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2006084262	A1	20060810	WO 2006-US4230	20060203
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
	RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	US 20060197053	A1	20060907	US 2006-346028	20060202
	AU 2006210403	A1	20060810	AU 2006-210403	20060203
	CA 2597199	A1	20060810	CA 2006-2597199	20060203
	EP 1846535	A1	20071024	EP 2006-734482	20060203
	R: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LI, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR				
	JP 2008530275	T	20080807	JP 2007-554312	20060203
	IN 2007DN06107	A	20070817	IN 2007-DN6107	20070806
	NO 2007004471	A	20071019	NO 2007-4471	20070903
	KR 2007103763	A	20071024	KR 2007-720068	20070903
	CN 101155893	A	20080402	CN 2006-80010998	20070930
PRAI	US 2005-650330P	P	20050204		
	WO 2006-US4230	W	20060203		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2006084262	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]; C07C0309-00 [I,A]
	ECLA	C09K005/04D
US 20060197053	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]
	NCL	252/067.000
	ECLA	C09K005/04D
AU 2006210403	IPCI	C09K0005-00 [I,C]; C09K0005-04 [I,A]; C07C0309-00 [I,C]; C07C0309-00 [I,A]
	IPCR	C09K0005-00 [I,C]; C09K0005-04 [I,A]; C07C0309-00 [I,C]; C07C0309-00 [I,A]
	ECLA	C09K005/04D
CA 2597199	IPCI	C07C0309-00 [I,A]; C09K0005-04 [I,A]; C09K0005-00 [I,C*]
	IPCR	C09K0005-00 [I,C]; C09K0005-04 [I,A]; C07C0309-00 [I,C]; C07C0309-00 [I,A]
	ECLA	C09K005/04D
EP 1846535	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]; C07C0309-00 [I,A]
	ECLA	C09K005/04D
JP 2008530275	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]; F25B0015-00 [I,A]
	FTERM	3L093/LL01; 3L093/LL03
IN 2007DN06107	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
NO 2007004471	IPCI	C09K0005-00 [I,C]; C09K0005-04 [I,A]; C07C0309-00

[I,C]; C07C0309-00 [I,A]; C09K0005-00 [I,A]
IPCR C09K0005-00 [I,C]; C09K0005-04 [I,A]; C07C0309-00 [I,C]; C07C0309-00 [I,A]; C09K0005-00 [I,A]
ECLA C09K005/04D
KR 2007103763 IPCI C09K0005-04 [I,A]; C09K0005-00 [I,C*]
CN 101155893 IPCI C09K0005-04 [I,A]; C09K0005-00 [I,C*]; C07C0309-00 [I,A]

OS MARPAT 145:213529

AB The present invention relates to an absorption cycle comprising a refrigerant pair comprising at least one refrigerant and at least one ionic liquid The present invention also provides an absorption cycle that uses fluorocarbon gases in fluorinated ionic liqs. The present invention also provides a method of cooling using an absorption cycle comprising a refrigerant pair comprising at least one refrigerant and at least one ionic liquid The present invention also provides a method of heating using an absorption cycle comprising a refrigerant pair comprising at least one refrigerant and at least one ionic liquid

ST absorption cycle ionic liq working fluid refrigerator heat pump; substituted imidazolium onium salt halocarbon hydrocarbon blend absorption refrigerant

IT Alkenes, uses
Cycloalkenes
RL: TEM (Technical or engineered material use); USES (Uses)
(C1-C4; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)

IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(C1-4; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)

IT Onium compounds
RL: TEM (Technical or engineered material use); USES (Uses)
(C6-C20 aryl- and heteroaryl- substituted derivs., salts; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)

IT Thermodynamic cycle
(absorption, desorption, pressure effects; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)

IT Refrigerating apparatus
(absorption, refrigerators, ice machines; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)

IT Heat pumps
Refrigeration
(absorption; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)

IT Cooling apparatus
(absorptive, cooling systems; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)

IT Pressure
(adjustment; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)

IT Cooling apparatus
(air conditioning, absorption; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)

IT Alkanes, uses
Alkenes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(branched, C1-C4; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)

IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (chlorofluorocarbons; synthesis of ionic liqs. and absorption cycle
        utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT   Air conditioners
        (cooling apparatus, absorption; synthesis of ionic liqs. and absorption
        cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working
        fluid)
IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (cyclic, C1-C4; synthesis of ionic liqs. and absorption cycle utilizing
        ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro; synthesis of ionic liqs. and absorption cycle utilizing ionic
        liquid/halocarbon or hydrocarbon blend as working fluid)
IT   Onium compounds
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (halonium, halogen-substituted onium cations, salts; synthesis of ionic
        liqs. and absorption cycle utilizing ionic liquid/halocarbon or
        hydrocarbon blend as working fluid)
IT   Cyclic compounds
     RL: TEM (Technical or engineered material use); USES (Uses)
        (hydrocarbons, C1-C4; synthesis of ionic liqs. and absorption cycle
        utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT   Onium compounds
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (imidazolium compds.; synthesis of ionic liqs. and absorption cycle
        utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT   Anions
     Cations
        (ionic liquid salts of; synthesis of ionic liqs. and absorption cycle
        utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT   Halides
     RL: TEM (Technical or engineered material use); USES (Uses)
        (ions, fluoridated, salts; synthesis of ionic liqs. and absorption
        cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working
        fluid)
IT   Halides
     RL: TEM (Technical or engineered material use); USES (Uses)
        (ions, salts; synthesis of ionic liqs. and absorption cycle utilizing
        ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT   Heterocyclic compounds
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (nitrogen, onium cation-containing salts; synthesis of ionic liqs. and
        absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend
        as working fluid)
IT   Vapor-liquid equilibrium
        (of binary pairs of refrigerants, including one ionic liquid; synthesis
        of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or
        hydrocarbon blend as working fluid)
IT   Vapor pressure
        (of conventional refrigerants and blends with ionic liqs.; synthesis of
        ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or
        hydrocarbon blend as working fluid)
IT   Triple point
        (of halocarbon refrigerants and ionic liqs.; synthesis of ionic liqs.
        and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon
        blend as working fluid)

IT Diffusion
Solubility
(of halocarbons in ionic liqs.; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT Alcohols, uses
Amines, uses
Thiols, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(onium cation-containing salts; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT Heat capacity
(or refrigerants, estimated from group contribution methods; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT Heterocyclic compounds
RL: TEM (Technical or engineered material use); USES (Uses)
(oxygen, onium cation-containing salts; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT Heterocyclic compounds
RL: TEM (Technical or engineered material use); USES (Uses)
(sulfur, onium cation-containing salts; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT Condensers
Critical temperature
Evaporators
Ionic liquids
Refrigerants
Triple point
(synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT Onium compounds
Pyridinium compounds
RL: TEM (Technical or engineered material use); USES (Uses)
(synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT Heaters
(using absorption cycle; synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT 497-19-8, Sodium carbonate, reactions 7631-90-5, Sodium bisulfite 16731-55-8, Potassium metabisulfite
RL: MOA (Modifier or additive use); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
(synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT 67-64-1, Acetone, uses 109-99-9, Tetrahydrofuran, uses
RL: NUU (Other use, unclassified); USES (Uses)
(synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT 141-78-6, Ethyl acetate, processes
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT 91047-49-3P 874968-23-7P 905298-71-7P 905298-73-9P 905298-74-0P
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PUR (Purification or recovery); PYP (Physical process); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); RACT (Reactant or reagent)

(synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT 3916-24-3P 174899-82-2P, 1-Ethyl-3-methyl imidazolium bis(trifluoromethanesulfonyl)imide 880084-63-9P 880084-70-8P 880084-72-0P 905298-81-9P 905298-95-5P 905298-97-7P 905298-99-9P 905299-01-6P 905299-03-8P
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PUR (Purification or recovery); PYP (Physical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT 188589-28-8P, 1-Methyl-3-octylimidazolium iodide 270908-51-5P, 1,3-Dioctylimidazolium iodide 880084-62-8P
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PUR (Purification or recovery); PYP (Physical process); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT 880084-65-1P
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT 905298-91-1P
RL: PEP (Physical, engineering or chemical process); PUR (Purification or recovery); PYP (Physical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT 905298-76-2P 905298-83-1P 905298-85-3P 905298-87-5P
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT 75-46-7, Trifluoromethane 155371-19-0, 1-Ethyl-3-methyl imidazolium hexafluorophosphate 216299-72-8 216299-76-2 284049-75-8, 1-Butyl-3-methylimidazolium acetate 342789-81-5, 1-Butyl-3-methylimidazolium methanesulfonate 344790-86-9 344790-87-0, 1-Butyl-3-methylimidazolium thiocyanate 880084-64-0 905299-08-3
RL: PRP (Properties)
(synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT 75-10-5, Difluoromethane 75-37-6, 1,1-Difluoroethane 75-45-6, Chlorodifluoromethane 353-36-6, Fluoroethane 354-33-6, Pentafluoroethane 359-35-3, 1,1,2,2-Tetrafluoroethane 420-46-2 , 1,1,1-Trifluoroethane 593-53-3, Fluoromethane 811-97-2, 1,1,1,2-Tetrafluoroethane 7664-41-7, Ammonia, properties 7732-18-5, Water, properties 16919-18-9D, salts 169051-76-7 169051-77-8 174501-64-5, 1-Butyl-3-methyl imidazolium hexafluorophosphate 174501-65-6, 1-Butyl-3-methyl imidazolium tetrafluoroborate 174899-83-3 880084-66-2
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(synthesis of ionic liqs. and absorption cycle utilizing ionic liquid/halocarbon or hydrocarbon blend as working fluid)
IT 111-83-1, Octyl bromide 116-14-3, Tetrafluoroethene, reactions 116-15-4, Hexafluoropropene 288-32-4, Imidazole, reactions 616-47-7, 1-Methylimidazole 629-27-6, 1-Iodooctane 1187-93-5, Perfluoro(methylvinyl ether) 3115-68-2, Tetra-n-butylphosphonium bromide 7757-83-7, Sodium sulfite 7790-56-9 10493-43-3, Perfluoro(ethylvinyl

ether) 20461-54-5, Iodide, reactions 26914-02-3, Iodopropane
61546-01-8, 1-Hexadecyl-3-methylimidazolium chloride 65039-09-0,
1-Ethyl-3-methylimidazolium chloride 79917-90-1, 1-Butyl-3-
methylimidazolium chloride 81741-28-8, Cyphos IL 167 98892-75-2,
1-Butyl-2,3-dimethylimidazolium chloride 114569-84-5,
1-Dodecyl-3-methylimidazolium chloride 117205-07-9 171058-17-6,
1-Hexyl-3-methylimidazolium chloride 171058-19-8, 1-Octadecyl-3-
methylimidazolium chloride 258864-54-9 905298-79-5
RL: RCT (Reactant); RACT (Reactant or reagent)
(synthesis of ionic liqs. and absorption cycle utilizing ionic
liquid/halocarbon or hydrocarbon blend as working fluid)

IT 71-50-1D, Acetate ion, salts 71-52-3D, Bicarbonate (HCO3-), salts
74-82-8, Methane, uses 74-84-0, Ethane, uses 74-85-1, Ethylene, uses
74-98-6, Propane, uses 75-19-4, Cyclopropane 75-28-5, Isobutane
75-71-8, Dichlorodifluoromethane 75-73-0, Perfluoromethane 76-16-4,
Perfluoroethane 106-97-8, Butane, uses 115-07-1, Propene, uses
124-38-9, Carbon dioxide, uses 1333-74-0, Hydrogen, uses 2927-24-4
3812-32-6D, Carbonate, salts 7440-37-1, Argon, uses 7727-37-9,
Nitrogen, uses 7782-44-7, Oxygen, uses 14066-19-4D, Hydrogen phosphate
ion (HPO42-), salts 14066-20-7D, Dihydrogen phosphate ion (H2PO4-),
salts 14265-44-2D, Phosphate, salts 14477-72-6D, Trifluoroacetate ion,
salts 14762-94-8D, Fluorine atom, compds., uses 14797-55-8D, Nitrate
(NO3-), salts 14797-65-0D, Nitrite (NO2-), salts 14808-79-8D, Sulfate,
salts 14874-70-5D, salts 14996-02-2D, Bisulfate ion, salts
15181-46-1D, salts 15697-16-2D, salts 16887-00-6D, Chloride, salts
16984-48-8D, Fluoride ion, salts 17009-91-5D, Pyrazolium, derivs., salts
17009-93-7D, Pyrazinium, derivs., salts 17009-95-9D, Pyrimidinium,
derivs., salts 17009-97-1D, Pyridazinium, derivs., salts 17111-95-4D,
salts 17611-22-2D, salts 20461-54-5D, Iodide, salts 21228-90-0D,
salts 24959-67-9D, Bromide, salts 25167-67-3, Butene 28589-79-9D,
Thiazolium, derivs., salts 29727-06-8, Imidazolium
trifluoromethanesulfonate 37181-39-8D, salts 48028-76-8D, salts
64001-57-6D, Oxazolium, derivs., salts 98837-98-0D, salts
112725-76-5D, derivs. 112725-83-4D, derivs. 130447-45-9D, salts
172870-67-6D, salts 174645-81-9, 1-Butyl-3-methyl imidazolium
hexafluoroantimonate 174899-66-2, 1-Butyl-3-methyl imidazolium
trifluoromethanesulfonate 174899-94-6, 1-Butyl-3-methyl imidazolium
trifluoroacetate 291768-96-2D, derivs., salts 512813-38-6
731774-32-6 880084-61-7D, salts 886220-75-3 905298-54-6D, salts
905298-56-8D, derivs. 905298-58-0 905298-60-4 905298-63-7
905298-68-2
RL: TEM (Technical or engineered material use); USES (Uses)
(synthesis of ionic liqs. and absorption cycle utilizing ionic
liquid/halocarbon or hydrocarbon blend as working fluid)

IT 7550-35-8, Lithium bromide
RL: TEM (Technical or engineered material use); USES (Uses)
(working fluid component in refrigerant cycles; synthesis of ionic
liqs. and absorption cycle utilizing ionic liquid/halocarbon or
hydrocarbon blend as working fluid)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Angell; US 6155057 A 2000 CAPLUS
(2) Boesmann, A; WO 2005113702 A 2005 CAPLUS
(3) Korea Res Inst Chem Technology; KR 2004017506 A 2004
(4) Universitaet Essen; DE 3623680 A1 1988 CAPLUS
(5) Wu, B; PROCEEDINGS OF SOLAR FORUM SOLAR ENERGY: THE POWER TO CHOOSE 2001

L15 ANSWER 17 OF 175 CAPLUS
AN 2006:517194 CAPLUS
DN 145:30580
ED Entered STN: 02 Jun 2006
TI Compositions of HFC-152a and CF3I

IN Singh, Rajiv; Morris, Thomas
PA Honeywell International Inc., USA
SO U.S. Pat. Appl. Publ., 13 pp., Cont.-in-part of U.S. Ser. No. 109,188.
CODEN: USXXCO
DT Patent
LA English
INCL 510415000
CC 51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 13

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 20060116310	A1	20060601	US 2005-250219	20051014
	US 20050233931	A1	20051020	US 2004-826072	20040416
	US 7074751	B2	20060711		
	US 20050233934	A1	20051020	US 2004-826592	20040416
	US 6969701	B2	20051129		
	US 20050233932	A1	20051020	US 2004-826597	20040416
	US 7098176	B2	20060829		
	US 20050233933	A1	20051020	US 2004-826727	20040416
	US 20050233923	A1	20051020	US 2004-826811	20040416
	US 7413674	B2	20080819		
	US 20060025322	A1	20060202	US 2005-109188	20050418
PRAI	US 2004-563085P	P	20040416		
	US 2004-826072	A2	20040416		
	US 2004-826592	A2	20040416		
	US 2004-826597	A2	20040416		
	US 2004-826727	A2	20040416		
	US 2004-826811	A2	20040416		
	US 2005-109188	A2	20050418		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 20060116310	INCL	510415000
	IPCI	C11D0017-00 [I,A]
	IPCR	C11D0017-00 [I,A]; C11D0017-00 [I,C]
	NCL	510/415.000
	ECLA	C11D007/50D2D
US 20050233931	IPCI	C11D0007-50 [I,A]
	IPCR	C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-00 [I,C*]; C11D0017-00 [I,A]; F25D0001-00 [I,C*]; F25D0001-00 [I,A]
	NCL	510/408.000; 510/412.000
	ECLA	C11D007/50D2M
US 20050233934	IPCI	C11D0017-00 [ICM,7]; F25D0001-00 [ICS,7]; C11D0007-50 [ICS,7]
	IPCR	C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-00 [I,C*]; C11D0017-00 [I,A]; F25B0009-00 [I,C*]; F25B0009-00 [I,A]; F25D0001-00 [I,C*]; F25D0001-00 [I,A]
	NCL	510/412.000; 510/407.000; 510/408.000; 510/415.000
	ECLA	C09K003/30; C09K005/04B4B; C11D007/50D2D; F25B009/00B4
US 20050233932	IPCI	C11D0007-50 [I,A]
	IPCR	C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-08 [I,C*]; C11D0017-08 [I,A]
	NCL	510/408.000; 252/067.000; 510/412.000; 510/415.000
	ECLA	C08J009/14H2F; C09K005/04B4B; C11D007/50D2D
US 20050233933	IPCI	F25D0001-00 [ICM,7]; C11D0017-08 [ICS,7]
	IPCR	C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-08 [I,C*]; C11D0017-08 [I,A]; F25B0009-00 [N,C*]; F25B0009-00 [N,A]; F25D0001-00 [I,C*]; F25D0001-00

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                         [I,A]
                  NCL    510/408.000
                  ECLA   C11D007/50D2M; R25B
 US 20050233923   IPCI   C11D0017-00 [I,A]
                  IPCR   C10M0101-00 [I,C*]; C10M0101-00 [I,A]
                  NCL    510/177.000
 US 20060025322   IPCI   C11D0017-00 [I,A]
                  IPCR   C11D0017-00 [I,A]; C08J0009-00 [I,C*]; C08J0009-00
                         [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A];
                         C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0017-00
                         [I,C]
                  NCL    510/408.000
                  ECLA   C09K003/30; C09K005/04B4B
```

AB   Azeotrope-like compns. comprising difluoroethane and trifluoroiodomethane are suitable for use in refrigerant compns., refrigeration systems, blowing agent compns., aerosol propellants, etc. and may contain supplemental lubricants, compatibilizers, surfactants, supplemental flame suppressants, solubilizing agents, dispersing agents, cell stabilizers, cosmetics, polishing agents, medicaments, cleaners, fire retarding agents, colorants, chemical sterilants, stabilizers, polyols, polyol premix components and combinations of two or more of these.

ST   difluoroethane trifluoroiodomethane azeotrope refrigerant blowing agent propellant

IT   Azeotropes
   (binary; compns. of HFC-152a and CF3I for refrigerants, blowing agents, and propellants)

IT   Blowing agents
Cleaning apparatus
Coloring materials
Cosmetics
Disinfectants
Dispersing agents
Drugs
Fireproofing agents
Lubricants
Polishing materials
Polymer blend compatibilizers
Propellants (sprays and foams)
Refrigerants
Solubilizers
Stabilizing agents
Surfactants
   (compns. of HFC-152a and CF3I for refrigerants, blowing agents, and propellants)

IT   Hydrocarbon oils
Polyolefins
Polyoxyalkylenes, uses
Polysiloxanes, uses
Synthetic rubber, uses
RL: MOA (Modifier or additive use); USES (Uses)
   (compns. of HFC-152a and CF3I for refrigerants, blowing agents, and propellants)

IT   Polyoxyalkylenes, uses
RL: MOA (Modifier or additive use); USES (Uses)
   (esters; compns. of HFC-152a and CF3I for refrigerants, blowing agents, and propellants)

IT   Alcohols, uses
RL: MOA (Modifier or additive use); USES (Uses)
   (polyhydric, esters; compns. of HFC-152a and CF3I for refrigerants, blowing agents, and propellants)

IT   Alcohols, uses
RL: MOA (Modifier or additive use); USES (Uses)

```
        (polyhydric; compns. of HFC-152a and CF3I for refrigerants, blowing
        agents, and propellants)
IT   75-10-5, HFC-32   75-45-6 354-33-6, HFC-125
     420-46-2, HFC-143a   9003-19-4D, Polyvinyl ether, derivs.
     61529-50-8D, Benzol S, alkyl derivs.
     RL: MOA (Modifier or additive use); USES (Uses)
        (compns. of HFC-152a and CF3I for refrigerants, blowing agents, and
        propellants)
IT   75-37-6, HFC-152a 811-97-2, HFC-134a   2314-97-8, Trifluoro iodo
     methane
     RL: TEM (Technical or engineered material use); USES (Uses)
        (compns. of HFC-152a and CF3I for refrigerants, blowing agents, and
        propellants)

L15  ANSWER 18 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2006:192246  CAPLUS
DN   144:256914
ED   Entered STN:  02 Mar 2006
TI   Compositions comprising tetrafluoropropene and carbon dioxide
IN   Shankland, Ian; Singh, Rajiv R.
PA   Honeywell International, Inc., USA
SO   U.S. Pat. Appl. Publ., 20 pp., Cont.-in-part of U.S. Ser. No. 837,521.
     CODEN: USXXCO
DT   Patent
LA   English
INCL 252067000
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 26
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
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PI   US 20060043331       A1    20060302   US 2005-118833         20050429
     US 20050241805       A1    20051103   US 2004-837521         20040429
     CA 2564897           A1    20051117   CA 2005-2564897        20050429
     CA 2564903           A1    20051117   CA 2005-2564903        20050429
     EP 1740518           A1    20070110   EP 2005-740929         20050429
         R:  AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,
             IS, IT, LI, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR
     EP 1740521           A1    20070110   EP 2005-744032         20050429
         R:  AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,
             IS, IT, LI, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR
     CN 1968915           A     20070523   CN 2005-80020225       20050429
     CN 1972887           A     20070530   CN 2005-80020412       20050429
     JP 2007535561        T     20071206   JP 2007-511040         20050429
     JP 2007535570        T     20071206   JP 2007-511080         20050429
     MX 2006PA12467       A     20070129   MX 2006-PA12467        20061027
     MX 2006PA12468       A     20070129   MX 2006-PA12468        20061027
     KR 2007005737        A     20070110   KR 2006-725179         20061129
     KR 2007011554        A     20070124   KR 2006-725180         20061129
     CA 2608327           A1    20080427   CA 2007-2608327        20071026
     CA 2608675           A1    20080427   CA 2007-2608675        20071026
     EP 1916231           A2    20080430   EP 2007-119432         20071026
         R:  AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,
             IS, IT, LI, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR,
             AL, BA, HR, MK, RS
     EP 1916232           A1    20080430   EP 2007-119443         20071026
         R:  AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,
             IS, IT, LI, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR,
             AL, BA, HR, MK, RS
     WO 2008057794        A1    20080515   WO 2007-US82601        20071026
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA,
             CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI,
             GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG,
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             KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME,
             MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL,
             PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN,
             TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW
         RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,
             IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR, BF,
             BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW,
             GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,
             BY, KG, KZ, MD, RU, TJ, TM
     KR 2008038074          A      20080502    KR 2007-109198          20071029
     KR 2008038075          A      20080502    KR 2007-109199          20071029
     JP 2008110980          A      20080515    JP 2007-280802          20071029
     CN 101182280           A      20080521    CN 2007-10199937        20071029
     JP 2008162999          A      20080717    JP 2007-280719          20071029
PRAI US 2004-567425P        P      20040429
     US 2004-567426P        P      20040429
     US 2004-567427P        P      20040429
     US 2004-567428P        P      20040429
     US 2004-567429P        P      20040429
     US 2004-837521         A2     20040429
     WO 2005-US14950        W      20050429
     WO 2005-US15124        W      20050429
     US 2006-588464         A      20061027
     US 2006-588465         A      20061027
     US 2006-588671         A      20061027
CLASS
 PATENT NO.        CLASS  PATENT FAMILY CLASSIFICATION CODES
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 US 20060043331    INCL   252067000
                   IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,C*]
                   IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]
                   NCL    252/067.000
                   ECLA   C09K005/04B4B
 US 20050241805    IPCI   F28D0015-00 [ICM,7]
                   IPCR   A61L0002-16 [I,C*]; A61L0002-16 [I,A]; C08J0009-00
                          [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*];
                          C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04
                          [I,A]
                   NCL    165/104.120
                   ECLA   C09K003/30; C09K005/04B4B
 CA 2564897        IPCI   C07C0017-269 [I,A]; C07C0017-272 [I,A]; C07C0017-358
                          [I,A]; C07C0017-00 [I,C*]; C07C0021-18 [I,A];
                          C07C0021-00 [I,C*]
                   IPCR   C07C0021-00 [I,C]; C07C0021-18 [I,A]; C07C0017-00
                          [I,C]; C07C0017-00 [I,A]; C07C0017-20 [I,A];
                          C07C0017-26 [I,A]; C07C0017-269 [I,A]; C07C0017-272
                          [I,A]; C07C0017-358 [I,A]
                   ECLA   C07C017/269+21/18; C07C017/00+21/18;
                          C07C017/20D4+21/18; C07C017/26; C07C017/269;
                          C07C017/272+21/18; C07C017/272; C07C021/18
 CA 2564903        IPCI   C07C0017-20 [I,A]; C07C0017-25 [I,A]; C07C0017-278
                          [I,A]; C07C0017-00 [I,C*]; C07C0019-01 [I,A];
                          C07C0019-08 [I,A]; C07C0019-10 [I,A]; C07C0019-14
                          [I,A]; C07C0019-16 [I,A]; C07C0019-00 [I,C*];
                          C07C0021-18 [I,A]; C07C0021-00 [I,C*]
                   IPCR   C07C0017-00 [I,C]; C07C0017-25 [I,A]; C07C0017-20
                          [I,A]; C07C0017-278 [I,A]; C07C0019-00 [I,C];
                          C07C0019-01 [I,A]; C07C0019-08 [I,A]; C07C0019-10
                          [I,A]; C07C0019-14 [I,A]; C07C0019-16 [I,A];
                          C07C0021-00 [I,C]; C07C0021-18 [I,A]
                   ECLA   C07C017/25+21/18; C07C017/20D4+19/10;
                          C07C017/278+19/01; C07C017/278+19/10;
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C07C017/278+19/14; C07C017/278+19/16; C07C017/278;
C07C021/18

EP 1740518 IPCI C07C0017-25 [I,A]; C07C0021-18 [I,A]; C07C0021-00 [I,C*]; C07C0017-20 [I,A]; C07C0019-08 [I,A]; C07C0017-278 [I,A]; C07C0017-00 [I,C*]; C07C0019-16 [I,A]; C07C0019-14 [I,A]; C07C0019-10 [I,A]; C07C0019-01 [I,A]; C07C0019-00 [I,C*]

IPCR C07C0017-00 [I,C]; C07C0017-25 [I,A]; C07C0017-20 [I,A]; C07C0017-278 [I,A]; C07C0019-00 [I,C]; C07C0019-01 [I,A]; C07C0019-08 [I,A]; C07C0019-10 [I,A]; C07C0019-14 [I,A]; C07C0019-16 [I,A]; C07C0021-00 [I,C]; C07C0021-18 [I,A]

ECLA C07C017/25+21/18; C07C017/20D4+19/10; C07C017/278+19/01; C07C017/278+19/10; C07C017/278+19/14; C07C017/278+19/16; C07C017/278; C07C021/18

EP 1740521 IPCI C07C0021-18 [I,A]; C07C0021-00 [I,C*]; C07C0017-269 [I,A]; C07C0017-272 [I,A]; C07C0017-358 [I,A]; C07C0017-00 [I,C*]

IPCR C07C0021-00 [I,C]; C07C0021-18 [I,A]; C07C0017-00 [I,C]; C07C0017-00 [I,A]; C07C0017-20 [I,A]; C07C0017-26 [I,A]; C07C0017-269 [I,A]; C07C0017-272 [I,A]; C07C0017-358 [I,A]

ECLA C07C017/269+21/18; C07C017/00+21/18; C07C017/20D4+21/18; C07C017/26; C07C017/269; C07C017/272+21/18; C07C017/272; C07C021/18

CN 1968915 IPCI C07C0021-18 [I,A]; C07C0021-00 [I,C*]; C07C0017-269 [I,A]; C07C0017-272 [I,A]; C07C0017-358 [I,A]; C07C0017-00 [I,C*]

IPCR C07C0021-00 [I,C]; C07C0021-18 [I,A]

CN 1972887 IPCI C07C0017-25 [I,A]; C07C0021-18 [I,A]; C07C0021-00 [I,C*]; C07C0017-20 [I,A]; C07C0019-08 [I,A]; C07C0017-278 [I,A]; C07C0017-00 [I,C*]; C07C0019-16 [I,A]; C07C0019-14 [I,A]; C07C0019-10 [I,A]; C07C0019-01 [I,A]; C07C0019-00 [I,C*]

IPCR C07C0017-00 [I,C]; C07C0017-25 [I,A]

JP 2007535561 IPCI C07C0017-269 [I,A]; C07C0021-18 [I,A]; C07C0021-00 [I,C*]; C07C0017-26 [I,A]; C07C0017-358 [I,A]; C07C0017-00 [I,C*]; C07B0061-00 [N,A]

IPCR C07C0017-00 [I,C]; C07C0017-269 [I,A]; C07B0061-00 [N,C]; C07B0061-00 [N,A]; C07C0017-00 [I,A]; C07C0017-20 [I,A]; C07C0017-26 [I,A]; C07C0017-272 [I,A]; C07C0017-358 [I,A]; C07C0021-00 [I,C]; C07C0021-18 [I,A]

ECLA C07C017/269+21/18; C07C017/00+21/18; C07C017/20D4+21/18; C07C017/26; C07C017/269; C07C017/272+21/18; C07C017/272; C07C021/18

FTERM 4H006/AA02; 4H006/AC24; 4H006/AC27; 4H006/BC10; 4H006/BC18; 4H006/BC31; 4H006/EA03; 4H039/CA29; 4H039/CL25

JP 2007535570 IPCI C07C0017-35 [I,A]; C07C0017-00 [I,C*]; C07C0021-18 [I,A]; C07C0021-00 [I,C*]; C07B0061-00 [N,A]

IPCR C07C0017-00 [I,C]; C07C0017-35 [I,A]; C07B0061-00 [N,C]; C07B0061-00 [N,A]; C07C0017-20 [I,A]; C07C0017-25 [I,A]; C07C0017-278 [I,A]; C07C0021-00 [I,C]; C07C0021-18 [I,A]

ECLA C07C017/25+21/18; C07C017/20D4+19/10; C07C017/278+19/01; C07C017/278+19/10; C07C017/278+19/14; C07C017/278+19/16; C07C017/278; C07C021/18

FTERM 4H006/AA02; 4H006/AC21; 4H006/AC26; 4H006/BA05; 4H006/BA11; 4H006/BA14; 4H006/BA19; 4H006/BA25;

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                      4H006/BA37; 4H006/BA45; 4H006/BA46; 4H006/BA48;
                      4H006/BC10; 4H006/BC14; 4H006/BC18; 4H006/EA03;
                      4H039/CA29; 4H039/CA50; 4H039/CF10; 4H039/CG20
 MX 2006PA12467  IPCI C07C0021-18 [I,A]; C07C0021-00 [I,C*]; C07C0017-269
                      [I,A]; C07C0017-272 [I,A]; C07C0017-358 [I,A];
                      C07C0017-00 [I,C*]
 MX 2006PA12468  IPCI C07C0017-25 [I,A]; C07C0017-20 [I,A]; C07C0017-278
                      [I,A]; C07C0017-00 [I,C*]; C07C0019-01 [I,A];
                      C07C0019-08 [I,A]; C07C0019-10 [I,A]; C07C0019-14
                      [I,A]; C07C0019-16 [I,A]; C07C0019-00 [I,C*];
                      C07C0021-18 [I,A]; C07C0021-00 [I,C*]
 KR 2007005737   IPCI C07C0017-272 [I,A]; C07C0017-358 [I,A]; C07C0017-269
                      [I,A]; C07C0017-00 [I,C*]; C07C0021-18 [I,A];
                      C07C0021-00 [I,C*]
 KR 2007011554   IPCI C07C0017-25 [I,A]; C07C0017-278 [I,A]; C07C0017-20
                      [I,A]; C07C0017-00 [I,C*]
 CA 2608327      IPCI C07C0017-357 [I,A]; C07C0017-00 [I,C*]; C07C0021-18
                      [N,A]; C07C0021-00 [N,C*]
 CA 2608675      IPCI C07C0017-354 [I,A]; C07C0017-00 [I,C*]; C07C0019-08
                      [N,A]; C07C0019-10 [N,A]; C07C0019-00 [N,C*]
 EP 1916231      IPCI C07C0017-25 [I,A]; C07C0017-00 [I,C*]; C07C0021-18
                      [I,A]; C07C0021-00 [I,C*]
 EP 1916232      IPCI C07C0017-354 [I,A]; C07C0017-00 [I,C*]; C07C0019-08
                      [I,A]; C07C0019-00 [I,C*]
 WO 2008057794   IPCI C07C0017-25 [I,A]; C07C0017-354 [I,A]; C07C0017-00
                      [I,C*]; C07C0019-08 [I,A]; C07C0019-10 [I,A];
                      C07C0019-14 [I,A]; C07C0019-00 [I,C*]; C07C0021-18
                      [I,A]; C07C0021-00 [I,C*]
 KR 2008038074   IPCI C07C0019-08 [I,A]; C07C0019-00 [I,A]; C07C0017-013
                      [I,A]; C07C0017-25 [I,A]; C07C0017-00 [I,C*]
 KR 2008038075   IPCI C07C0021-18 [I,A]; C07C0021-00 [I,C*]; C07C0019-08
                      [I,A]; C07C0019-00 [I,A]
 JP 2008110980   IPCI C07C0017-25 [I,A]; C07C0017-00 [I,C*]; C07C0021-18
                      [I,A]; C07C0021-00 [I,C*]; C07B0061-00 [I,A]
                 FTERM 4H006/AA02; 4H006/AC13; 4H006/BA02; 4H006/BA03;
                      4H006/BA05; 4H006/BA06; 4H006/BA07; 4H006/BA08;
                      4H006/BA09; 4H006/BA19; 4H006/BA20; 4H006/BA21;
                      4H006/BA37; 4H039/CA20; 4H039/CG20
 CN 101182280    IPCI C07C0019-08 [I,A]; C07C0019-00 [I,C*]; C07C0017-354
                      [I,A]; C07C0017-00 [I,C*]
 JP 2008162999   IPCI C07C0017-354 [I,A]; C07C0017-00 [I,C*]; C07C0019-08
                      [I,A]; C07C0019-00 [I,C*]; C07B0061-00 [N,A];
                      B01J0023-44 [N,A]
                 FTERM 4G169/AA03; 4G169/BA08B; 4G169/BC72B; 4G169/CB02;
                      4G169/DA08; 4G169/EA02Y; 4H006/AA02; 4H006/AC30;
                      4H006/BA25; 4H006/BA32; 4H006/BA61; 4H006/BD20;
                      4H006/BD60; 4H006/BM10; 4H006/BM71; 4H039/CA51;
                      4H039/CB10
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OS MARPAT 144:256914

AB The compns.. which are useful in a wide variety of applications, including heat transfer fluids, possess a highly desirable and unexpectedly superior combination of properties. The preferred heat transfer fluid comprises from .apprx.1 to .apprx.40%, on a weight basis, of carbon dioxide (CO2) and from .apprx.99 to .apprx.60%, on a weight basis, of XCFzR3-z (I), where X is a C2 or a C3 unsatd., substituted or unsubstituted, alkyl radical, each R is independently Cl, F, Br, I or H, and z is 1 to 3. A preferred I is tetrafluoropropene, particularly 1,1,1,3-tetrafluoropropene and/or 1,1,1,3-tetrafluoropropene.

ST heat transfer fluid blowing agent tetrafluoropropene carbon dioxide

IT Phenols, uses
   RL: MOA (Modifier or additive use); USES (Uses)
      (foam; heat transfer fluids and blowing agents comprising

tetrafluoropropene and carbon dioxide)
IT Air conditioning
Blowing agents
Coloring materials
Cosmetics
Dispersing agents
Drugs
Fireproofing agents
Heat pumps
Lubricants
Polishing materials
Polymer blend compatibilizers
Refrigerating apparatus
Solubilizers
Stabilizing agents
Surfactants
(heat transfer fluids and blowing agents comprising tetrafluoropropene and carbon dioxide)
IT Hydrocarbon oils
Polyisocyanurates
Polyolefins
Polyoxyalkylenes, uses
Polysiloxanes, uses
Polyurethanes, uses
Synthetic rubber, uses
RL: MOA (Modifier or additive use); USES (Uses)
(heat transfer fluids and blowing agents comprising tetrafluoropropene and carbon dioxide)
IT Cleaning
(materials; heat transfer fluids and blowing agents comprising tetrafluoropropene and carbon dioxide)
IT Alcohols, uses
RL: MOA (Modifier or additive use); USES (Uses)
(polyhydric, esters; heat transfer fluids and blowing agents comprising tetrafluoropropene and carbon dioxide)
IT Alcohols, uses
RL: MOA (Modifier or additive use); USES (Uses)
(polyhydric; heat transfer fluids and blowing agents comprising tetrafluoropropene and carbon dioxide)
IT Insecticides
(sterilants; heat transfer fluids and blowing agents comprising tetrafluoropropene and carbon dioxide)
IT Plastics, uses
RL: MOA (Modifier or additive use); USES (Uses)
(thermoplastics; heat transfer fluids and blowing agents comprising tetrafluoropropene and carbon dioxide)
IT 75-10-5, HFC-32 75-37-6, HFC-152a 75-45-6, HCFC-22
354-33-6, HFC-125 420-46-2, HFC-143a 811-97-2,
HFC-134a 9002-88-4, Polyethylene 9003-19-4, Polyvinyl ether
9003-53-6, Polystyrene 61529-50-8D, Benzol S, alkyl derivs.
133023-17-3, R-410A 150621-87-7, R-507A 150743-07-0, R-404A
158675-78-6, R-407C
RL: MOA (Modifier or additive use); USES (Uses)
(heat transfer fluids and blowing agents comprising tetrafluoropropene and carbon dioxide)
IT 124-38-9, Carbon dioxide, uses 754-12-1, HFO-1234yf 1645-83-6
29118-24-9 51053-29-3, Tetrafluoropropene
RL: TEM (Technical or engineered material use); USES (Uses)
(heat transfer fluids and blowing agents comprising tetrafluoropropene and carbon dioxide)

L15 ANSWER 19 OF 175 CAPLUS

AN   2006:192223 CAPLUS
DN   144:256913
ED   Entered STN: 02 Mar 2006
TI   Azeotrope-like compositions of tetrafluoropropene and trifluoroiodomethane
IN   Wilson, David P.; Pham, Hang T.; Singh, Rajiv R.; Thomas, Raymond H.
PA   Honeywell International Inc., USA
SO   U.S. Pat. Appl. Publ., 13 pp., Cont.-in-part of U.S. Ser. No. 826,811.
     CODEN: USXXCO
DT   Patent
LA   English
INCL 252067000
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 13

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 20060043330	A1	20060302	US 2005-109189	20050418
	US 20050233931	A1	20051020	US 2004-826072	20040416
	US 7074751	B2	20060711		
	US 20050233934	A1	20051020	US 2004-826592	20040416
	US 6969701	B2	20051129		
	US 20050233932	A1	20051020	US 2004-826597	20040416
	US 7098176	B2	20060829		
	US 20050233933	A1	20051020	US 2004-826727	20040416
	US 20050233923	A1	20051020	US 2004-826811	20040416
	US 7413674	B2	20080819		
PRAI	US 2004-563085P	P	20040416		
	US 2004-826072	A2	20040416		
	US 2004-826592	A2	20040416		
	US 2004-826597	A2	20040416		
	US 2004-826727	A2	20040416		
	US 2004-826811	A2	20040416		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 20060043330	INCL	252067000
	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]
	IPCR	C09K0005-00 [I,C]; C09K0005-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]
	NCL	252/067.000
	ECLA	C09K003/30; C09K005/04B4B
US 20050233931	IPCI	C11D0007-50 [I,A]
	IPCR	C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-00 [I,C*]; C11D0017-00 [I,A]; F25D0001-00 [I,C*]; F25D0001-00 [I,A]
	NCL	510/408.000; 510/412.000
	ECLA	C11D007/50D2M
US 20050233934	IPCI	C11D0017-00 [ICM,7]; F25D0001-00 [ICS,7]; C11D0007-50 [ICS,7]
	IPCR	C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-00 [I,C*]; C11D0017-00 [I,A]; F25B0009-00 [I,C*]; F25B0009-00 [I,A]; F25D0001-00 [I,C*]; F25D0001-00 [I,A]
	NCL	510/412.000; 510/407.000; 510/408.000; 510/415.000
	ECLA	C09K003/30; C09K005/04B4B; C11D007/50D2D; F25B009/00B4
US 20050233932	IPCI	C11D0007-50 [I,A]
	IPCR	C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-08 [I,C*]; C11D0017-08 [I,A]
	NCL	510/408.000; 252/067.000; 510/412.000; 510/415.000
	ECLA	C08J009/14H2F; C09K005/04B4B; C11D007/50D2D

US 20050233933 IPCI F25D0001-00 [ICM,7]; C11D0017-08 [ICS,7]
IPCR C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-08 [I,C*]; C11D0017-08 [I,A]; F25B0009-00 [N,C*]; F25B0009-00 [N,A]; F25D0001-00 [I,C*]; F25D0001-00 [I,A]
NCL 510/408.000
ECLA C11D007/50D2M; R25B
US 20050233923 IPCI C11D0017-00 [I,A]
IPCR C10M0101-00 [I,C*]; C10M0101-00 [I,A]
NCL 510/177.000

AB Provided are azeotrope-like compns. comprising tetrafluoropropene and trifluoroiodomethane and uses thereof, including use in refrigerant compns., refrigeration systems, blowing agent compns., and sprayable compns., including aerosol propellants.

ST azeotrope tetrafluoropropene trifluoroiodomethane refrigerant propellant

IT Blowing agents
Cleaning solvents
Cosmetics
Drugs
Lubricants
Propellants (sprays and foams)
Refrigerants
(azeotrope-like compns. of difluoromethane and trifluoroiodomethane)

IT Fireproofing agents
Foams
Lubricating oils
(azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)

IT Hydrocarbon oils
Polyolefins
Polyoxyalkylenes, uses
Polysiloxanes, uses
RL: MOA (Modifier or additive use); USES (Uses)
(azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)

IT Polyisocyanurates
Polyurethanes, uses
RL: MOA (Modifier or additive use); USES (Uses)
(foams; azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)

IT Alcohols, uses
RL: MOA (Modifier or additive use); USES (Uses)
(polyhydric, esters; azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)

IT Plastic foams
RL: MOA (Modifier or additive use); USES (Uses)
(thermoplastic; azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)

IT 75-10-5, HFC-32 354-33-6, HFC-125 420-46-2, HFC-143a
RL: MOA (Modifier or additive use); USES (Uses)
(azeotrope-like compns. of difluoromethane and trifluoroiodomethane)

IT 71-43-2D, Benzene, alkyl derivs. 75-37-6, HFC-152a 75-71-8, R-12 811-97-2, HFC-134a 9003-19-4, Polyvinyl ether 56275-41-3, R-500
RL: MOA (Modifier or additive use); USES (Uses)
(azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)

IT 754-12-1, HFO-1234yf 2314-97-8, Trifluoroiodomethane
RL: TEM (Technical or engineered material use); USES (Uses)
(azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)

IT 9002-88-4, Polyethylene 9003-53-6, Polystyrene
RL: MOA (Modifier or additive use); USES (Uses)
(foams; azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)

L15 ANSWER 20 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2006:149941 CAPLUS
DN 144:215682
ED Entered STN: 17 Feb 2006
TI Azeotrope-like compositions of difluoromethane and trifluoroiodomethane
IN Wilson, David P.; Pham, Hang T.; Singh, Rajiv R.
PA Honeywell International Inc., USA
SO U.S. Pat. Appl. Publ., 11 pp., Cont.-in-part of U.S. Ser. No. 826,811.
CODEN: USXXCO
DT Patent
LA English
INCL 252067000
CC 51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 13

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 20060033071	A1	20060216	US 2005-109195	20050418
	US 20050233931	A1	20051020	US 2004-826072	20040416
	US 7074751	B2	20060711		
	US 20050233934	A1	20051020	US 2004-826592	20040416
	US 6969701	B2	20051129		
	US 20050233932	A1	20051020	US 2004-826597	20040416
	US 7098176	B2	20060829		
	US 20050233933	A1	20051020	US 2004-826727	20040416
	US 20050233923	A1	20051020	US 2004-826811	20040416
	US 7413674	B2	20080819		
PRAI	US 2004-563085P	P	20040416		
	US 2004-826072	A2	20040416		
	US 2004-826592	A2	20040416		
	US 2004-826597	A2	20040416		
	US 2004-826727	A2	20040416		
	US 2004-826811	A2	20040416		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 20060033071	INCL	252067000
	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]
	IPCR	C09K0005-00 [I,C]; C09K0005-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]
	NCL	252/067.000
	ECLA	C09K003/30; C09K005/04B4B
US 20050233931	IPCI	C11D0007-50 [I,A]
	IPCR	C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-00 [I,C*]; C11D0017-00 [I,A]; F25D0001-00 [I,C*]; F25D0001-00 [I,A]
	NCL	510/408.000; 510/412.000
	ECLA	C11D007/50D2M
US 20050233934	IPCI	C11D0017-00 [ICM,7]; F25D0001-00 [ICS,7]; C11D0007-50 [ICS,7]
	IPCR	C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-00 [I,C*]; C11D0017-00 [I,A]; F25B0009-00 [I,C*]; F25B0009-00 [I,A]; F25D0001-00 [I,C*]; F25D0001-00 [I,A]
	NCL	510/412.000; 510/407.000; 510/408.000; 510/415.000
	ECLA	C09K003/30; C09K005/04B4B; C11D007/50D2D; F25B009/00B4
US 20050233932	IPCI	C11D0007-50 [I,A]
	IPCR	C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-08 [I,C*]; C11D0017-08 [I,A]

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                 NCL    510/408.000; 252/067.000; 510/412.000; 510/415.000
                 ECLA   C08J009/14H2F; C09K005/04B4B; C11D007/50D2D
 US 20050233933  IPCI   F25D0001-00 [ICM,7]; C11D0017-08 [ICS,7]
                 IPCR   C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-08
                        [I,C*]; C11D0017-08 [I,A]; F25B0009-00 [N,C*];
                        F25B0009-00 [N,A]; F25D0001-00 [I,C*]; F25D0001-00
                        [I,A]
                 NCL    510/408.000
                 ECLA   C11D007/50D2M; R25B
 US 20050233923  IPCI   C11D0017-00 [I,A]
                 IPCR   C10M0101-00 [I,C*]; C10M0101-00 [I,A]
                 NCL    510/177.000
AB   Provided are azeotrope-like compns. comprising difluoromethane and
     trifluoroiodomethane and uses thereof, including use in refrigerant
     compns., refrigeration systems, blowing agent compns., and
     aerosol propellants.
ST   azeotrope difluoromethane trifluoroiodomethane refrigerant propellant
IT   Blowing agents
     Cleaning solvents
     Cosmetics
     Drugs
     Fire-resistant materials
       Foams
     Lubricants
     Lubricating oils
     Propellants (sprays and foams)
     Refrigerants
        (azeotrope-like compns. of difluoromethane and trifluoroiodomethane)
IT   Hydrocarbon oils
     Polyolefins
     Polyoxyalkylenes, uses
     Polysiloxanes, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (azeotrope-like compns. of difluoromethane and trifluoroiodomethane)
IT   Polyisocyanurates
     Polyurethanes, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (foams; azeotrope-like compns. of difluoromethane and
        trifluoroiodomethane)
IT   Alcohols, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (polyhydric, esters; azeotrope-like compns. of difluoromethane and
        trifluoroiodomethane)
IT   Plastic foams
     RL: MOA (Modifier or additive use); USES (Uses)
        (thermoplastic; azeotrope-like compns. of difluoromethane and
        trifluoroiodomethane)
IT   71-43-2D, Benzene, alkyl derivs.   75-45-6, R-22 354-33-6,
     HFC-125 420-46-2, HFC-143a 811-97-2, HFC-134a
     9003-19-4D, Polyvinyl ether, derivs   133023-17-3, R-410A   150621-87-7,
     R-507A   150743-07-0, R404A   158675-78-6, R-407A
     RL: MOA (Modifier or additive use); USES (Uses)
        (azeotrope-like compns. of difluoromethane and trifluoroiodomethane)
IT   75-10-5, Difluoromethane   2314-97-8, Trifluoroiodomethane
     RL: TEM (Technical or engineered material use); USES (Uses)
        (azeotrope-like compns. of difluoromethane and trifluoroiodomethane)
IT   9002-88-4, Polyethylene   9003-53-6, Polystyrene
     RL: MOA (Modifier or additive use); USES (Uses)
        (foams; azeotrope-like compns. of difluoromethane and
        trifluoroiodomethane)
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AN   2006:104619 CAPLUS
DN   144:173968
ED   Entered STN: 03 Feb 2006
TI   Azeotrope-like compositions of difluoromethane and trifluoroiodomethane
IN   Wilson, David P.; Pham, Hang T.; Singh, Rajiv R.
PA   Honeywell International Inc., USA
SO   U.S. Pat. Appl. Publ., 13 pp., Cont.-in-part of U.S. Ser. No. 826,811.
     CODEN: USXXCO
DT   Patent
LA   English
INCL 510408000
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 13

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 20060025322	A1	20060202	US 2005-109188	20050418
	US 20050233931	A1	20051020	US 2004-826072	20040416
	US 7074751	B2	20060711		
	US 20050233934	A1	20051020	US 2004-826592	20040416
	US 6969701	B2	20051129		
	US 20050233932	A1	20051020	US 2004-826597	20040416
	US 7098176	B2	20060829		
	US 20050233933	A1	20051020	US 2004-826727	20040416
	US 20050233923	A1	20051020	US 2004-826811	20040416
	US 7413674	B2	20080819		
	US 20060116310	A1	20060601	US 2005-250219	20051014
	WO 2006112881	A1	20061026	WO 2005-US37010	20051014

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	EP 1920024	A1	20080514	EP 2005-822632	20051014

R: DE, ES, FR, GB, IT

PRAI	US 2004-563085P	P	20040416
	US 2004-826072	A2	20040416
	US 2004-826592	A2	20040416
	US 2004-826597	A2	20040416
	US 2004-826727	A2	20040416
	US 2004-826811	A2	20040416
	US 2005-109188	A2	20050418
	WO 2005-US37010	W	20051014

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 20060025322	INCL	510408000
	IPCI	C11D0017-00 [I,A]
	IPCR	C11D0017-00 [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0017-00 [I,C]
	NCL	510/408.000
	ECLA	C09K003/30; C09K005/04B4B
US 20050233931	IPCI	C11D0007-50 [I,A]
	IPCR	C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-00

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                      [I,C*]; C11D0017-00 [I,A]; F25D0001-00 [I,C*];
                      F25D0001-00 [I,A]
               NCL    510/408.000; 510/412.000
               ECLA   C11D007/50D2M
 US 20050233934 IPCI  C11D0017-00 [ICM,7]; F25D0001-00 [ICS,7]; C11D0007-50
                      [ICS,7]
               IPCR   C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00
                      [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*];
                      C11D0007-50 [I,A]; C11D0017-00 [I,C*]; C11D0017-00
                      [I,A]; F25B0009-00 [I,C*]; F25B0009-00 [I,A];
                      F25D0001-00 [I,C*]; F25D0001-00 [I,A]
               NCL    510/412.000; 510/407.000; 510/408.000; 510/415.000
               ECLA   C09K003/30; C09K005/04B4B; C11D007/50D2D; F25B009/00B4
 US 20050233932 IPCI  C11D0007-50 [I,A]
               IPCR   C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04
                      [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A];
                      C11D0017-08 [I,C*]; C11D0017-08 [I,A]
               NCL    510/408.000; 252/067.000; 510/412.000; 510/415.000
               ECLA   C08J009/14H2F; C09K005/04B4B; C11D007/50D2D
 US 20050233933 IPCI  F25D0001-00 [ICM,7]; C11D0017-08 [ICS,7]
               IPCR   C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-08
                      [I,C*]; C11D0017-08 [I,A]; F25B0009-00 [N,C*];
                      F25B0009-00 [N,A]; F25D0001-00 [I,C*]; F25D0001-00
                      [I,A]
               NCL    510/408.000
               ECLA   C11D007/50D2M; R25B
 US 20050233923 IPCI  C11D0017-00 [I,A]
               IPCR   C10M0101-00 [I,C*]; C10M0101-00 [I,A]
               NCL    510/177.000
 US 20060116310 IPCI  C11D0017-00 [I,A]
               IPCR   C11D0017-00 [I,A]; C11D0017-00 [I,C]
               NCL    510/415.000
               ECLA   C11D007/50D2D
 WO 2006112881  IPCI  C09K0005-04 [I,A]; C09K0005-00 [I,C*]; C08J0009-00
                      [I,A]
               IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]; C08J0009-00
                      [I,C]; C08J0009-00 [I,A]
               ECLA   C08J009/14H; C09K003/30; C09K005/04B4B
 EP 1920024     IPCI  C09K0005-04 [I,A]; C09K0005-00 [I,C*]; C08J0009-00
                      [I,A]
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AB   Provided are azeotrope-like compns. comprising difluoroethane and trifluoroiodomethane, azeotrope-like compns. comprising difluoroethane, tetrafluoropropene and trifluoroiodomethane, and uses thereof, including use in refrigerant compns., refrigeration systems, blowing agent compns., aerosol propellants and others.

ST   azeotrope difluoroethane trifluoroiodomethane refrigerant blowing agent propellant

IT   Blowing agents
     Heat transfer agents
     Propellants (sprays and foams)
     Refrigerants
        (azeotrope-like compns. of difluoromethane and trifluoroiodomethane)

IT   Hydrocarbon oils
     Polyolefins
     Polyoxyalkylenes, uses
     Synthetic rubber, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (azeotrope-like compns. of difluoromethane and trifluoroiodomethane)

IT   Azeotropes
        (binary; azeotrope-like compns. of difluoromethane and trifluoroiodomethane)

IT   Polysiloxanes, uses

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     RL: MOA (Modifier or additive use); USES (Uses)
        (oil; azeotrope-like compns. of difluoromethane and
        trifluoroiodomethane)
IT   Alcohols, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (polyhydric, esters; azeotrope-like compns. of difluoromethane and
        trifluoroiodomethane)
IT   Azeotropes
        (ternary; azeotrope-like compns. of difluoromethane and
        trifluoroiodomethane)
IT   71-43-2D, Benzene, alkyl derivs.   75-37-6, HFC-152a   75-45-6
     354-33-6, HFC-125 420-46-2, HFC-143a 811-97-2,
     HFC-134a   9003-19-4, Polyvinyl ether
     RL: MOA (Modifier or additive use); USES (Uses)
        (azeotrope-like compns. of difluoromethane and trifluoroiodomethane)
IT   75-10-5, Difluoromethane   2314-97-8, Trifluoroiodomethane
     29118-24-9
     RL: TEM (Technical or engineered material use); USES (Uses)
        (azeotrope-like compns. of difluoromethane and trifluoroiodomethane)

L15  ANSWER 22 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2006:94801  CAPLUS
DN   144:173962
ED   Entered STN:  02 Feb 2006
TI   Azeotrope-like compositions of tetrafluoropropene and pentafluoropropene
IN   Wilson, David P.; Pham, Hang T.; Singh, Rajiv R.; Thomas, Raymond H.;
     Nalewajek, David
PA   Honeywell International Inc., USA
SO   U.S. Pat. Appl. Publ., 11 pp., Cont.-in-part of U.S. Ser. No. 826,811.
     CODEN: USXXCO
DT   Patent
LA   English
INCL 252068000
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 13
     PATENT NO.          KIND   DATE       APPLICATION NO.       DATE
     ---------------     ----   --------   --------------------  --------
PI   US 20060022166       A1    20060202   US 2005-109190        20050418
     US 20050233931       A1    20051020   US 2004-826072        20040416
     US 7074751           B2    20060711
     US 20050233934       A1    20051020   US 2004-826592        20040416
     US 6969701           B2    20051129
     US 20050233932       A1    20051020   US 2004-826597        20040416
     US 7098176           B2    20060829
     US 20050233933       A1    20051020   US 2004-826727        20040416
     US 20050233923       A1    20051020   US 2004-826811        20040416
     US 7413674           B2    20080819
PRAI US 2004-563085P      P     20040416
     US 2004-826072       A2    20040416
     US 2004-826592       A2    20040416
     US 2004-826597       A2    20040416
     US 2004-826727       A2    20040416
     US 2004-826811       A2    20040416
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 US 20060022166  INCL   252068000
                 IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,A]
                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]; C08J0009-00
                        [I,C*]; C08J0009-00 [I,A]; C09K0003-30 [I,C*];
                        C09K0003-30 [I,A]; C09K0005-00 [I,A]
                 NCL    252/068.000
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                 ECLA   C09K003/30; C09K005/04B4B
 US 20050233931  IPCI   C11D0007-50 [I,A]
                 IPCR   C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-00
                        [I,C*]; C11D0017-00 [I,A]; F25D0001-00 [I,C*];
                        F25D0001-00 [I,A]
                 NCL    510/408.000; 510/412.000
                 ECLA   C11D007/50D2M
 US 20050233934  IPCI   C11D0017-00 [ICM,7]; F25D0001-00 [ICS,7]; C11D0007-50
                        [ICS,7]
                 IPCR   C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*];
                        C11D0007-50 [I,A]; C11D0017-00 [I,C*]; C11D0017-00
                        [I,A]; F25B0009-00 [I,C*]; F25B0009-00 [I,A];
                        F25D0001-00 [I,C*]; F25D0001-00 [I,A]
                 NCL    510/412.000; 510/407.000; 510/408.000; 510/415.000
                 ECLA   C09K003/30; C09K005/04B4B; C11D007/50D2D; F25B009/00B4
 US 20050233932  IPCI   C11D0007-50 [I,A]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04
                        [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A];
                        C11D0017-08 [I,C*]; C11D0017-08 [I,A]
                 NCL    510/408.000; 252/067.000; 510/412.000; 510/415.000
                 ECLA   C08J009/14H2F; C09K005/04B4B; C11D007/50D2D
 US 20050233933  IPCI   F25D0001-00 [ICM,7]; C11D0017-08 [ICS,7]
                 IPCR   C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-08
                        [I,C*]; C11D0017-08 [I,A]; F25B0009-00 [N,C*];
                        F25B0009-00 [N,A]; F25D0001-00 [I,C*]; F25D0001-00
                        [I,A]
                 NCL    510/408.000
                 ECLA   C11D007/50D2M; R25B
 US 20050233923  IPCI   C11D0017-00 [I,A]
                 IPCR   C10M0101-00 [I,C*]; C10M0101-00 [I,A]
                 NCL    510/177.000
AB   Provided are azeotrope-like compns. comprising tetrafluoropropene and
     pentafluoropropene and uses thereof, including use in refrigerant compns.,
     blowing agent compns., foamable compns., foams,
     sterilant compns., sprayable compns., and systems and methods using same.
ST   azeotrope tetrafluoropropene trifluoroiodomethane refrigerant blowing
     agent
IT   Blowing agents
     Propellants (sprays and foams)
     Refrigerants
        (azeotrope-like compns. of tetrafluoropropene and pentafluoropropene)
IT   Hydrocarbon oils
     Polyolefins
     Polyoxyalkylenes, uses
     Polysiloxanes, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (azeotrope-like compns. of tetrafluoropropene and pentafluoropropene)
IT   Synthetic rubber, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)
IT   Azeotropes
        (binary; azeotrope-like compns. of tetrafluoropropene and
        pentafluoropropene)
IT   Alcohols, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (polyhydric, esters; azeotrope-like compns. of tetrafluoropropene and
        pentafluoropropene)
IT   71-43-2D, Benzene, alkyl derivs.   9003-19-4, Polyvinyl ether
     RL: MOA (Modifier or additive use); USES (Uses)
        (azeotrope-like compns. of tetrafluoropropene and pentafluoropropene)
IT   754-12-1   37145-46-3, Pentafluoropropene
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     RL: TEM (Technical or engineered material use); USES (Uses)
        (azeotrope-like compns. of tetrafluoropropene and pentafluoropropene)
IT   75-10-5, HFC-32   75-37-6, HFC-152a   75-45-6 354-33-6,
     HFC-125 420-46-2, HFC-143a 811-97-2, HFC-134a
     RL: MOA (Modifier or additive use); USES (Uses)
        (azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)

L15  ANSWER 23 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2006:76856  CAPLUS
DN   144:173960
ED   Entered STN:  27 Jan 2006
TI   Azeotrope-like compositions of tetrafluoropropene and trifluoroiodomethane
IN   Wilson, David P.; Pham, Hang T.; Singh, Rajiv R.
PA   Honeywell International Inc., USA
SO   U.S. Pat. Appl. Publ., 12 pp., Cont.-in-part of U.S. Ser. No. 826,811.
     CODEN: USXXCO
DT   Patent
LA   English
INCL 510408000
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 13
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
     ---------------     ----   --------   --------------------   --------
PI   US 20060019857       A1    20060126   US 2005-109187         20050418
     US 7341984           B2    20080311
     US 20050233931       A1    20051020   US 2004-826072         20040416
     US 7074751           B2    20060711
     US 20050233934       A1    20051020   US 2004-826592         20040416
     US 6969701           B2    20051129
     US 20050233932       A1    20051020   US 2004-826597         20040416
     US 7098176           B2    20060829
     US 20050233933       A1    20051020   US 2004-826727         20040416
     US 20050233923       A1    20051020   US 2004-826811         20040416
     US 7413674           B2    20080819
PRAI US 2004-563085P      P     20040416
     US 2004-826072       A2    20040416
     US 2004-826592       A2    20040416
     US 2004-826597       A2    20040416
     US 2004-826727       A2    20040416
     US 2004-826811       A2    20040416
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 US 20060019857  INCL   510408000
                 IPCI   C11D0017-00 [I,A]; C11D0007-50 [I,A]
                 IPCR   C11D0017-00 [I,A]; C08J0009-00 [I,C*]; C08J0009-00
                        [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A];
                        C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0017-00
                        [I,C]
                 NCL    510/408.000; 510/412.000
                 ECLA   C09K003/30; C09K005/04B4B
 US 20050233931  IPCI   C11D0007-50 [I,A]
                 IPCR   C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-00
                        [I,C*]; C11D0017-00 [I,A]; F25D0001-00 [I,C*];
                        F25D0001-00 [I,A]
                 NCL    510/408.000; 510/412.000
                 ECLA   C11D007/50D2M
 US 20050233934  IPCI   C11D0017-00 [ICM,7]; F25D0001-00 [ICS,7]; C11D0007-50
                        [ICS,7]
                 IPCR   C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*];
                        C11D0007-50 [I,A]; C11D0017-00 [I,C*]; C11D0017-00
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                      [I,A]; F25B0009-00 [I,C*]; F25B0009-00 [I,A];
                      F25D0001-00 [I,C*]; F25D0001-00 [I,A]
               NCL    510/412.000; 510/407.000; 510/408.000; 510/415.000
               ECLA   C09K003/30; C09K005/04B4B; C11D007/50D2D; F25B009/00B4
 US 20050233932 IPCI  C11D0007-50 [I,A]
               IPCR   C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04
                      [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A];
                      C11D0017-08 [I,C*]; C11D0017-08 [I,A]
               NCL    510/408.000; 252/067.000; 510/412.000; 510/415.000
               ECLA   C08J009/14H2F; C09K005/04B4B; C11D007/50D2D
 US 20050233933 IPCI  F25D0001-00 [ICM,7]; C11D0017-08 [ICS,7]
               IPCR   C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-08
                      [I,C*]; C11D0017-08 [I,A]; F25B0009-00 [N,C*];
                      F25B0009-00 [N,A]; F25D0001-00 [I,C*]; F25D0001-00
                      [I,A]
               NCL    510/408.000
               ECLA   C11D007/50D2M; R25B
 US 20050233923 IPCI  C11D0017-00 [I,A]
               IPCR   C10M0101-00 [I,C*]; C10M0101-00 [I,A]
               NCL    510/177.000
AB   Provided are azeotrope-like compns. comprising tetrafluoropropene and
     trifluoroiodomethane and uses thereof, including use in refrigerant
     compns., refrigeration systems, blowing agent compns., and
     aerosol propellants.
ST   azeotrope tetrafluoropropene trifluoroiodomethane refrigerant blowing
     agent
IT   Blowing agents
     Propellants (sprays and foams)
     Refrigerants
     Stabilizing agents
        (azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)
IT   Alkadienes
     Epoxides
     Hydrocarbon oils
     Phenols, uses
     Phosphates, uses
     Polyolefins
     Polyoxyalkylenes, uses
     Polysiloxanes, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)
IT   Azeotropes
        (binary; azeotrope-like compns. of tetrafluoropropene and
        trifluoroiodomethane)
IT   Alcohols, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (polyhydric, esters; azeotrope-like compns. of tetrafluoropropene and
        trifluoroiodomethane)
IT   71-43-2D, Benzene, alkyl derivs. 75-10-5, HFC-32   75-37-6,
     HFC-152a   75-45-6 354-33-6, HFC-125 420-46-2,
     HFC-143a 811-97-2, HFC-134a   9003-19-4, Polyvinyl ether
     RL: MOA (Modifier or additive use); USES (Uses)
        (azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)
IT   2314-97-8, Trifluoroiodomethane   29118-24-9
     RL: TEM (Technical or engineered material use); USES (Uses)
        (azeotrope-like compns. of tetrafluoropropene and trifluoroiodomethane)
RE.CNT  8     THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
```


(1) Anon; Ashrae Standard; Proposed American National Standard; Sealed Glass Tube Method to Test the Chemical Stability of Materials for Use Within Refrigerant Systems; Public Review Draft 1997
(2) Anon; SAE: Surface Vehicle Recommended Practice; Compatibility of Retrofit

    Refrigerants with Air-Conditioning System Materials 1993
(3) Bartlett; US 5182040 A 1993 CAPLUS
(4) Bartlett; US 5648017 A 1997 CAPLUS
(5) Nimitz; US 5611210 A 1997 CAPLUS
(6) Nimitz; US 5716549 A 1998 CAPLUS
(7) Singh; US 7074751 B2 2006 CAPLUS
(8) Thomas; US 5380449 A 1995 CAPLUS

AN   2005:1132159 CAPLUS
DN   145:106706
ED   Entered STN: 21 Oct 2005
TI   Cooling performance and energy saving of a compression-absorption
     refrigeration system assisted by geothermal energy
AU   Kairouani, L.; Nehdi, E.
CS   Unite de Recherche Energetique et Environnement, Ecole Nationale
     d'Ingenieurs de Tunis, Le Belvedere, 1002, Tunisia
SO   Applied Thermal Engineering (2005), Volume Date 2006, 26(2-3), 288-294
     CODEN: ATENFT; ISSN: 1359-4311
PB   Elsevier Ltd.
DT   Journal
LA   English
CC   52-3 (Electrochemical, Radiational, and Thermal Energy Technology)
     Section cross-reference(s): 59
AB   The objectives of this paper are to develop a novel combined
     refrigeration system, and to discuss the thermodn. anal. of the
     cycle and the feasibility of its practical development. The aim of this
     work was to study the possibility of using geothermal energy to supply
     vapor absorption system cascaded with conventional compression system.
     Three working fluids (R717, R22, and R134a) are selected for the
     conventional compression system and the ammonia-water pair for the
     absorption system. The geothermal temperature source in the range 343-349 K
     supplies a generator operating at 335 K. Results show that the coefficient of
     performance (COP) of a combined system is significantly higher than that
     of a single stage refrigeration system. It is found that the
     COP can be improved by 37-54%, compared with the conventional cycle, under
     the same operating conditions, that is an evaporation temperature at 263 K and
a
     condensation temperature of 308 K. For industrial refrigeration, the
     proposed system constitutes an alternative solution for reducing energy
     consumption and greenhouse gas emissions.
ST   compression absorption refrigeration system geothermal energy
IT   Refrigerating apparatus
        (absorption; cooling performance and energy saving of
        compression-absorption refrigeration system assisted by
        geothermal energy)
IT   Geothermal energy
       Refrigerating apparatus
        (cooling performance and energy saving of compression-absorption
        refrigeration system assisted by geothermal energy)
IT   75-10-5, R32   75-37-6, R152a   75-45-6, R22   306-83-2, R123
     354-33-6, R125 420-46-2, R143a   431-89-0, R227
     811-97-2, R134a   133023-17-3, R410a   150621-87-7, R507
     150743-07-0, R404a   158675-78-6, R407c
     RL: TEM (Technical or engineered material use); USES (Uses)
        (working fluid; cooling performance and energy saving of
        compression-absorption refrigeration system assisted by
        geothermal energy using)
IT   7664-41-7, Ammonia, uses   7732-18-5, Water, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (working pair containing; cooling performance and energy saving of
        compression-absorption refrigeration system assisted by

```
        geothermal energy using)
RE.CNT  17    THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Ayala, R; Applied Thermal Engineering 1997, V17, P223 CAPLUS
(2) Ayala, R; Applied Thermal Engineering 1998, V18, P661 CAPLUS
(3) Ben Mohamed, M; Geothermics 2003, V32, P505
(4) Best, R; Journal of Heat Recovery Systems 1986, V6, P209 CAPLUS
(5) Bouguecha, S; Desalination 2002, V152, P237
(6) Bulgan, A; Energy Conversion and Management 1997, V38, P1431 CAPLUS
(7) Chinnappa, J; Solar Energy 1993, V50, P453 CAPLUS
(8) Ennoumi, A; Revue de l'Electricite et du Gaz 2000, V8, P5
(9) Goktun, S; Applied Energy 1999, V62, P67 CAPLUS
(10) Goktun, S; Energy Conversion and Management 2000, V41, P1885
(11) Hulten, M; International Journal of Refrigeration 2002, V25, P487 CAPLUS
(12) Kairouani, L; Building and Environment 2004, V39, P351
(13) Kairouani, L; Valorisation energetique des eaux geothermales du sud
    Tunisien 2002, VII, P429
(14) Kececiler, A; Energy Conversion and Management 2000, V41, P37 CAPLUS
(15) Misra, R; Energy 2002, V27, P1009 CAPLUS
(16) Santoyo-Gutierrez, S; Applied Thermal Engineering 1999, V19, P461 CAPLUS
(17) Syed, M; Energy Conversion and Management 1999, V40, P575

L15  ANSWER 25 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2005:472263  CAPLUS
DN   143:10302
ED   Entered STN:  03 Jun 2005
TI   Detectable refrigerant compositions and uses thereof
IN   Bivens, Donald Bernard; Leck, Thomas J.; Mcfarland, Mack; Minor, Barbara
     Haviland; Steichen, John Carl
PA   E.I. Dupont de Nemours and Company, USA
SO   PCT Int. Appl., 26 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM  C09K005-04
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.       DATE
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PI   WO 2005049759        A1    20050602   WO 2004-US38036        20041112
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH,
             CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD,
             GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
             LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI,
             NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY,
             TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
         RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM,
             AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK,
             EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO,
             SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
             NE, SN, TD, TG
     US 20050211949       A1    20050929   US 2004-984530         20041109
     AU 2004291895        A1    20050602   AU 2004-291895         20041112
     CA 2543979           A1    20050602   CA 2004-2543979        20041112
     EP 1682628           A1    20060726   EP 2004-810972         20041112
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK, IS
     CN 1882671           A     20061220   CN 2004-80033507       20041112
     BR 2004015805        A     20061226   BR 2004-15805          20041112
     JP 2007512396        T     20070517   JP 2006-539959         20041112
     IN 2006DN02225       A     20070615   IN 2006-DN2225         20060424
     KR 2007012621        A     20070126   KR 2006-709253         20060512
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    NO 2006002742        A     20060809   NO 2006-2742          20060613
PRAI US 2003-519790P     P     20031113
    US 2004-984530       A     20041109
    WO 2004-US38036      W     20041112
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 2005049759   ICM    C09K005-04
                 IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
                 ECLA   C09K005/04B4; C09K005/04B4B
 US 20050211949  IPCI   C09K0005-00 [ICM,7]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04
                        [I,A]; G01M0003-20 [I,C*]; G01M0003-22 [I,A]
                 NCL    252/067.000
                 ECLA   C09K005/04B; G01M003/22G4
 AU 2004291895   IPCI   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C09K0005-00
                        [I,A]; G01M0003-20 [I,C*]; G01M0003-22 [I,A]
 CA 2543979      IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,C*]
                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]; C09K0005-00
                        [I,A]; G01M0003-20 [I,C*]; G01M0003-22 [I,A]
                 ECLA   C09K005/04B; G01M003/22G4
 EP 1682628      IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]
                 ECLA   C09K005/04B4; C09K005/04B4B
 CN 1882671      IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,C*]
                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]
                 ECLA   C09K005/04B4; C09K005/04B4B
 BR 2004015805   IPCI   C09K0005-04 [ICS,7]; C09K0005-00 [ICS,7,C*]
                 IPCR   C09K0005-00 [I,C*]; G01M0003-20 [I,C*]; C09K0005-00
                        [I,A]; C09K0005-04 [I,A]; G01M0003-22 [I,A]
                 ECLA   C09K005/04B; G01M003/22G4
 JP 2007512396   IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,C*]; F25B0001-00
                        [I,A]; F25B0049-02 [N,A]
                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]; C09K0005-00
                        [I,A]; F25B0001-00 [I,C]; F25B0001-00 [I,A];
                        F25B0049-02 [N,C]; F25B0049-02 [N,A]; G01M0003-20
                        [I,C*]; G01M0003-22 [I,A]
 IN 2006DN02225  IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
 KR 2007012621   IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,A]
 NO 2006002742   IPCI   C09K0005-00 [I,C]; C09K0005-04 [I,A]; C09K0005-00 [I,A]
                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]; C09K0005-00
                        [I,A]; G01M0003-20 [I,C*]; G01M0003-22 [I,A]
                 ECLA   C09K005/04B; G01M003/22G4
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AB   Disclosed herein are detectable refrigerant compns., comprising from .apprx.0.001 to .apprx.5 weight percent tracer compns., which are useful to identify leaking in a vapor compression refrigeration and/or air conditioning system. The presence of the tracers make the refrigerant compns. detectable by chemo/electro-active array, corona discharge, heated diode, electrochem., photoionization, infra red, ultrasonic and electron capture detectors.

ST   tracer leak identification refrigerant

IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (chlorofluorocarbons; refrigerant compns. containing tracers for identification of leaks)

IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro; refrigerant compns. containing tracers for identification of leaks)

IT   Air conditioning

Leak
Refrigerants
Tracers
(refrigerant compns. containing tracers for identification of leaks)
IT Hydrocarbons, uses
Perfluorocarbons
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerant compns. containing tracers for identification of leaks)
IT Refrigeration
(vapor compression; refrigerant compns. containing tracers for identification of leaks)
IT 75-73-0, PFC 14
RL: TEM (Technical or engineered material use); USES (Uses)
(PFC 14; refrigerant compns. containing tracers for identification of leaks)
IT 74-82-8, Methane, uses 74-84-0, Ethane, uses 74-98-6, Propane, uses 75-07-0, Acetaldehyde, uses 75-10-5, HFC-32 75-19-4, Cyclopropane 75-28-5, 2-Methylpropane 75-37-6, HFC-152a 75-45-6, HCFC-22 75-46-7, HFC-23 75-68-3, HCFC-142b 76-16-4, PFC-116 76-19-7, PFC-218 78-78-4, 2-Methylbutane 98-08-8 98-56-6 106-97-8, n-Butane, uses 109-66-0, n-Pentane, uses 115-07-1, Propylene, uses 115-10-6, Dimethyl ether 123-38-6, Propionaldehyde, uses 124-38-9, Carbon dioxide, uses 141-43-5, Ethanolamine, uses 156-60-5, trans-1,2-Dichloroethylene 287-23-0, Cyclobutane 287-92-3, Cyclopentane 306-83-2, HCFC-123 353-36-6, HFC-161 354-33-6, HFC-125 354-64-3, Perfluoroethyl iodide 355-25-9, PFC 31-10 358-21-4 359-35-3, HFC-134 420-46-2, HFC-143a 421-14-7, HFE-143a 425-82-1, HFE-C 216 425-88-7, HFE 254cb2 463-82-1, 2,2-Dimethylpropane 593-53-3, HFC-41 594-11-6, Methylcyclopropane 598-61-8, Methylcyclobutane 665-16-7 811-97-2, HFC-134a 1479-49-8, Trifluoromethyl ether 2261-01-0, HFE 134a 2314-97-8, Perfluoromethyl iodide 2837-89-0, HCFC-124 3822-68-2, HFE-125 7446-09-5, Sulfur dioxide, uses 7664-41-7, Ammonia, uses 10024-97-2, Nitrous oxide, uses 10102-43-9, Nitric oxide, uses 11104-93-1, Nitrogen oxide, uses 22410-44-2, HFE 245cbEbg 57041-67-5, HFE 236eaEbg 62862-34-4 67282-99-9 70539-34-3 163702-05-4, HFE-7200 219484-64-7, HFE-7100 813468-14-3 813468-15-4 813468-16-5 813468-17-6 813468-18-7 813468-19-8 813468-20-1 813468-21-2 813468-22-3 813468-23-4 813468-24-5 813468-25-6 813468-26-7 813468-27-8 813468-28-9 813468-29-0 813468-30-3 813468-31-4 813468-32-5 813468-33-6 813468-34-7 813468-35-8 813468-36-9 813468-37-0 813468-38-1 813468-39-2 813468-40-5 813468-41-6 813468-42-7 813468-43-8 813468-44-9 813468-45-0 813468-46-1 813468-47-2 813468-48-3 813468-49-4 813468-50-7 813468-51-8 813468-52-9 813468-53-0 813468-54-1 813468-55-2 813468-58-5 813468-59-6 813468-60-9 813468-61-0 813468-62-1 813468-63-2 813468-64-3 813468-65-4 813468-66-5 813468-67-6 813468-68-7 813468-69-8 813468-70-1 813468-71-2 813468-72-3 813468-73-4 813468-74-5 813468-75-6 813468-76-7 813468-77-8 813468-79-0 852457-66-0 852457-68-2
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerant compns. containing tracers for identification of leaks)
RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

(1) Cavestri, R; US 6178809 B1 2001
(2) Daikin Kogyo Kk; JP 08245952 A 1996 CAPLUS
(3) Forschungszentrum Fuer Kaeltetechnik Und Waermepumpen Gmbh; DE 4116274 A1 1992 CAPLUS
(4) Henry; US 5421192 A 1995 CAPLUS
(5) Merchant; US 5064560 A 1991 CAPLUS
(6) Morris, P; US 2002121440 A1 2002 CAPLUS
(7) Saccavino; US 4294716 A 1981 CAPLUS
(8) Sanden Corporation; EP 1013738 A 2000 CAPLUS

(9) Seung-Yon, C; US 2003178597 A1 2003 CAPLUS
(10) Showa Denko Kk; JP 58013687 A 1983 CAPLUS
(11) Swan; US 6100229 A 2000 CAPLUS

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L15  ANSWER 26 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2005:346842  CAPLUS
DN   142:379418
ED   Entered STN:  22 Apr 2005
TI   Improvements in or relating to aerosol formulations comprising formoterol
     fumarate dihydrate
IN   Mueller-Walz, Rudi
PA   Jagotec A.-G., Switz.
SO   PCT Int. Appl., 23 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM  A61K009-72
     ICS  A61K031-67
CC   63-6 (Pharmaceuticals)
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
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PI   WO 2005034927        A2    20050421   WO 2004-IB3465         20041008
     WO 2005034927        A3    20050602
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             CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD,
             GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,
             LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI,
             NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY,
             TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
         RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM,
             AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK,
             EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE,
             SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE,
             SN, TD, TG
     CA 2540042           A1    20050421   CA 2004-2540042        20041008
     EP 1670443           A2    20060621   EP 2004-769700         20041008
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK
     US 20070218011       A1    20070920   US 2006-574302         20061102
PRAI GB 2003-23685        A     20031009
     WO 2004-IB3465       W     20041008
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 2005034927   ICM    A61K009-72
                 ICS    A61K031-67
                 IPCI   A61K0009-72 [ICM,7]; A61K0031-67 [ICS,7]
                 IPCR   A61K0009-00 [I,C*]; A61K0009-00 [I,A]; A61K0031-00
                        [I,C*]; A61K0031-00 [I,A]; A61K0031-58 [I,C*];
                        A61K0031-58 [I,A]; A61K0031-67 [I,C*]; A61K0031-67
                        [I,A]
                 ECLA   A61K009/00M20B6; A61K031/58+M; A61K031/67; A61K031/67+M
 CA 2540042      IPCI   A61K0009-72 [I,A]; A61K0031-00 [I,A]; A61K0031-67 [I,A]
                 IPCR   A61K0009-72 [I,A]; A61K0009-00 [I,C*]; A61K0009-00
                        [I,A]; A61K0009-72 [I,C]; A61K0031-00 [I,C];
                        A61K0031-00 [I,A]; A61K0031-58 [I,C*]; A61K0031-58
                        [I,A]; A61K0031-67 [I,C]; A61K0031-67 [I,A]
                 ECLA   A61K009/00M20B; A61K031/58+M; A61K031/67; A61K031/67+M
 EP 1670443      IPCI   A61K0009-72 [ICM,7]; A61K0031-67 [ICS,7]
                 IPCR   A61K0009-00 [I,C*]; A61K0009-00 [I,A]; A61K0031-00
                        [I,C*]; A61K0031-00 [I,A]; A61K0031-58 [I,C*];
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A61K0031-58 [I,A]; A61K0031-67 [I,C*]; A61K0031-67 [I,A]
ECLA A61K009/00M20B; A61K031/58+M; A61K031/67; A61K031/67+M
US 20070218011 IPCI A61K0009-12 [I,A]
NCL 424/045.000

AB A pharmaceutical aerosol formulation comprising formoterol fumarate dihydrate in suspension, and a steroid in solution, and a propellant, ethanol, and optionally a surfactant is disclosed, wherein the formoterol fumarate di-hydrate has a water content of about 4.8 to 4.28 % by weight, more particularly about 4.5 to 4.28%. An aerosol formulation contained formoterol fumarate dihydrate 0.0086, beclomethasone dipropionate 0.078130, absolute ethanol 7.500, HFA-227 92.369, disodium cromoglycate 0.3430, and oleic acid 0.0100%.

ST aerosol formulation formoterol fumarate dihydrate surfactant steroid

IT Drug delivery systems
(aerosols; improvements in or relating to aerosol formulations comprising formoterol fumarate dihydrate)

IT Quaternary ammonium compounds, biological studies
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(alkylbenzyldimethyl, chlorides; improvements in or relating to aerosol formulations comprising formoterol fumarate dihydrate)

IT Hydrocarbons, biological studies
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(chlorofluorocarbons; improvements in or relating to aerosol formulations comprising formoterol fumarate dihydrate)

IT Castor oil
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(ethoxylated; improvements in or relating to aerosol formulations comprising formoterol fumarate dihydrate)

IT Alkanes, biological studies
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(fluoro; improvements in or relating to aerosol formulations comprising formoterol fumarate dihydrate)

IT Alkanes, biological studies
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(hydrofluoro-; improvements in or relating to aerosol formulations comprising formoterol fumarate dihydrate)

IT Containers
Propellants (sprays and foams)
Surfactants
(improvements in or relating to aerosol formulations comprising formoterol fumarate dihydrate)

IT Lecithins
Polyesters, biological studies
Polyoxyalkylenes, biological studies
Steroids, biological studies
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(improvements in or relating to aerosol formulations comprising formoterol fumarate dihydrate)

IT Medical goods
(inhalers; improvements in or relating to aerosol formulations comprising formoterol fumarate dihydrate)

IT 7429-90-5, Aluminum, uses 73573-87-2, Formoterol
RL: DEV (Device component use); USES (Uses)
(improvements in or relating to aerosol formulations comprising formoterol fumarate dihydrate)

IT 64-17-5, Ethanol, biological studies 74-98-6, Propane, biological studies 75-10-5, Difluoromethane 75-28-5, Isobutane 75-43-4, Dichloro-monofluoromethane 75-45-6, Monochlorodifluoromethane 75-68-3, 1-Chloro-1,1-difluoroethane 75-69-4, Trichloro-monofluoromethane 75-71-8, Dichlorodifluoromethane 75-72-9, ,Monochlorotrifluoromethane 75-88-7, 2-Chloro-1,1,1-trifluoroethane 76-13-1, 1,1,2-Trichloro-1,2,2-

trifluoroethane 76-14-2, 1,2-Dichloro-1,1,2,2-tetrafluoroethane 76-15-3, 1-Chloro-1,1,2,2,2-pentafluoroethane 76-19-7, Octafluoropropane 76-25-5, Triamcinolone acetonide 106-97-8, Butane, biological studies 107-15-3D, Ethylenediamine, block copolymers 112-80-1, Oleic acid, biological studies 123-03-5, c.Etylpyridiniumchloride 124-94-7, Triamcinolone 306-83-2, 2,2-Dichloro-1,1,1-trifluoroethane 354-23-4, 1,2-Dichloro-1,1,2-trifluoroethane 354-25-6, f124a 354-33-6, Pentafluoroethane 359-35-3, 1,1,2,2-Tetrafluoroethane 420-46-2 , 1,1,1-Trifluoroethane 430-66-0, 1,1,2-Trifluoroethane 431-07-2, 1-Chloro-1,2,2-trifluoroethane 431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane 593-70-4, f31 811-97-2, 1,1,1,2-Tetrafluoroethane 1649-08-7, 1,2-Dichloro-1,1-difluoroethane 1717-00-6, 1,1-Dichloro-1-fluoroethane 2609-46-3, Amiloride 2837-89-0, 2-Chloro-1,1,1,2-tetrafluoroethane 3385-03-3, Flunisolide 4419-39-0, Beclomethasone 4533-89-5, Flunisolide acetate 5534-09-8, Beclomethasone dipropionate 9005-64-5 9005-65-6 9005-67-8 15826-37-6, Disodium cromoglycate 16110-51-3, Cromoglycic acid 25322-68-3 25322-68-3D, block copolymers 25322-69-4 25497-28-3, Difluoroethane 26266-58-0, Sorbitan trioleate 34721-16-9, Furoate 51333-22-3, Budesonide 69049-73-6, Nedocromil 90566-53-3, Fluticasone 105102-22-5, Mometasone 126544-47-6, Ciclesonide 129260-79-3, Loteprednol 144459-70-1, Rofleponide 151110-13-3, Fluticasone dipropionate 183814-30-4, Formoterol fumarate di-hydrate
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(improvements in or relating to aerosol formulations comprising formoterol fumarate dihydrate)

IT 9003-18-3
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(nitrile rubber; improvements in or relating to aerosol formulations comprising formoterol fumarate dihydrate)

L15 ANSWER 27 OF 175 CAPLUS
AN 2005:346830 CAPLUS
DN 142:397744
ED Entered STN: 22 Apr 2005
TI Aerosol formulations comprising formoterol fumarate dihydrate, ethanol and a steroid
IN Mueller-Walz, Rudi
PA Jagotec A.-G., Switz.
SO PCT Int. Appl., 27 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM A61K009-00
ICS A61K009-10; A61K009-12; A61K031-165; A61K031-56
CC 63-6 (Pharmaceuticals)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2005034911	A1	20050421	WO 2004-IB3481	20041008

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	CA 2540038	A1	20050421	CA 2004-2540038	20041008

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     EP 1670432          A1    20060621    EP 2004-769711         20041008
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
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     US 20070256685      A1    20071108    US 2007-574334         20070307
PRAI GB 2003-23684       A     20031009
     WO 2004-IB3481      W     20041008
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 2005034911   ICM    A61K009-00
                 ICS    A61K009-10; A61K009-12; A61K031-165; A61K031-56
                 IPCI   A61K0009-00 [ICM,7]; A61K0009-10 [ICS,7]; A61K0009-12
                        [ICS,7]; A61K0031-165 [ICS,7]; A61K0031-56 [ICS,7]
                 IPCR   A61K0009-10 [I,C*]; A61K0009-10 [I,A]; A61K0009-12
                        [I,C*]; A61K0009-12 [I,A]; A61K0031-165 [I,C*];
                        A61K0031-165 [I,A]; A61K0031-56 [I,C*]; A61K0031-56
                        [I,A]
                 ECLA   A61K031/165; A61K031/56
 CA 2540038      IPCI   A61K0009-00 [I,A]; A61K0009-10 [I,A]; A61K0009-12
                        [I,A]; A61K0031-165 [I,A]; A61K0031-56 [I,A]
                 IPCR   A61K0009-00 [I,A]; A61K0009-00 [I,C]; A61K0009-10
                        [I,C]; A61K0009-10 [I,A]; A61K0009-12 [I,C];
                        A61K0009-12 [I,A]; A61K0031-165 [I,C]; A61K0031-165
                        [I,A]; A61K0031-56 [I,C]; A61K0031-56 [I,A]
                 ECLA   A61K031/165; A61K031/56
 EP 1670432      IPCI   A61K0009-00 [ICM,7]; A61K0009-10 [ICS,7]; A61K0009-12
                        [ICS,7]; A61K0031-165 [ICS,7]; A61K0031-56 [ICS,7]
                 IPCR   A61K0009-10 [I,C*]; A61K0009-10 [I,A]; A61K0009-12
                        [I,C*]; A61K0009-12 [I,A]; A61K0031-165 [I,C*];
                        A61K0031-165 [I,A]; A61K0031-56 [I,C*]; A61K0031-56
                        [I,A]
                 ECLA   A61K031/165; A61K031/56
 US 20070256685  IPCI   A61M0011-00 [I,A]; A61K0031-167 [I,A]; A61K0031-56
                        [I,A]; A61P0011-00 [I,A]; A61P0011-06 [I,A];
                        A61K0009-12 [I,A]; A61K0009-14 [I,A]
                 NCL    128/200.230; 424/045.000; 424/046.000; 514/169.000;
                        514/613.000
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AB   A pharmaceutical aerosol formulation comprises formoterol fumarate dihydrate in suspension, and a steroid in suspension, and a propellant, ethanol, and optionally a surfactant, wherein the formoterol fumarate di-hydrate has a water content of 4.8-4.28% by weight Thus, a formulation contained formoterol fumarate dihydrate 0.009, fluticasone propionate 0.179, EtOH 1.429, HFA-22798.350, and disodium cromoglycate 0.034%.

ST   formoterol fumarate ethanol steroid aerosol; propellant fluoroalkane formoterol fumarate aerosol

IT   Containers
     Particle size distribution
     Propellants (sprays and foams)
     Surfactants
     Vials
        (aerosol formulations comprising formoterol fumarate and ethanol and steroid)

IT   Alkanes, biological studies
     Lecithins
     Steroids, biological studies
     RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
        (aerosol formulations comprising formoterol fumarate and ethanol and steroid)

IT   Drug delivery systems
        (aerosols, inhalants; aerosol formulations comprising formoterol fumarate and ethanol and steroid)

IT   Quaternary ammonium compounds, biological studies

RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(alkylbenzyldimethyl, chlorides; aerosol formulations comprising formoterol fumarate and ethanol and steroid)

IT Hydrocarbons, biological studies
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(chlorofluorocarbons; aerosol formulations comprising formoterol fumarate and ethanol and steroid)

IT Castor oil
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(ethoxylated; aerosol formulations comprising formoterol fumarate and ethanol and steroid)

IT Alkanes, biological studies
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(fluoro; aerosol formulations comprising formoterol fumarate and ethanol and steroid)

IT Medical goods
(inhalers; aerosol formulations comprising formoterol fumarate and ethanol and steroid)

IT 7429-90-5, Aluminum, biological studies
RL: DEV (Device component use); THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(aerosol formulations comprising formoterol fumarate and ethanol and steroid)

IT 64-17-5, Ethanol, biological studies 74-98-6, Propane, biological studies 75-10-5, HFA 32 75-28-5, Isobutane 75-37-6 75-43-4, F21 75-45-6, Monochlorodifluoromethane 75-68-3, F142b 75-69-4, F11 75-71-8, F12 75-72-9 75-88-7, F133a 76-13-1, F 113 76-14-2, F 114 76-15-3, 1-Chloro-1,1,2,2,2-pentafluoroethane 76-19-7, F 218 76-25-5, Triamcinolone acetonide 106-97-8, Butane, biological studies 112-80-1, Oleic acid, biological studies 123-03-5, Cetylpyridinium chloride 124-94-7, Triamcinolone 306-83-2, F 123 354-23-4, F 123a 354-25-6, F 124a 354-33-6, HFA 125 359-35-3, 1,1,2,2-Tetrafluoroethane 420-46-2, HFA 143a 430-66-0, HFA 143 431-07-2 431-89-0, HFA 227 593-70-4, F 31 811-97-2 1649-08-7, F 132b 1717-00-6, F141b 2609-46-3, Amiloride 2837-89-0 3385-03-3, Flunisolide 4419-39-0, Beclomethasone 4533-89-5, Flunisolide acetate 5534-09-8, Beclomethasone dipropionate 7732-18-5, Water, biological studies 9005-64-5, Polyoxyethylene sorbitan monolaurate 9005-65-6, Polyoxyethylene sorbitan monooleate 9005-67-8, Polyoxyethylene sorbitan monostearate 15826-37-6, Disodium cromoglycate 16110-51-3, Cromoglycic acid 26266-58-0, Sorbitan trioleate 51333-22-3, Budesonide 69049-73-6, Nedocromil 80474-14-2, Fluticasone propionate 83919-23-7, Mometasone furoate 90566-53-3, Fluticasone 105102-22-5, Mometasone 106392-12-5, Polyoxyethylene-polyoxypropylene block copolymer 126544-47-6, Ciclesonide 129260-79-3, Loteprednol 144459-70-1, Rofleponide 151110-13-3, Fluticasone dipropionate 183814-30-4, Formoterol fumarate dihydrate
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(aerosol formulations comprising formoterol fumarate and ethanol and steroid)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Blondino, F; US 2002018753 A1 2002 CAPLUS
(2) Clark; WO 0048587 A1 2000 CAPLUS
(3) Davies, R; WO 03074024 A1 2003 CAPLUS
(4) Keller, M; US 6475467 B1 2002 CAPLUS
(5) Oliver; US 6054488 A 2000 CAPLUS

L15 ANSWER 28 OF 175 CAPLUS
AN 2005:329916 CAPLUS
DN 143:117302
ED Entered STN: 18 Apr 2005

```
TI   Strengths of non-chlorine refrigerants and their influence on process
     organization
AU   Foerster, Hans
CS   Anlagenbau - Kaeltetechnik, IFM Ingenieurbuero Dr.-Ing.H.Foerster,
     Magdeburg, Germany
SO   KI Luft- und Kaeltetechnik (2005), 41(3), 86-90
     CODEN: KLKAE5; ISSN: 0945-0459
PB   C. F. Mueller Verlag
DT   Journal
LA   German
CC   48-5 (Unit Operations and Processes)
     Section cross-reference(s): 69
AB   Certain non-chlorine refrigerants (e.g. R507, R404A, R410A) feature
     extremely low isentropic exponents.  These hydrofluorocarbons are close to
     the ideal isotherms compression already.  To receive peak values of the
     performance figure the undercooling of the refrigerant has to be taken
     into account in far larger measure than with R22 and NH3.  The
     refrigerants mentioned prove in this particular usage outstanding good.
ST   refrigerant nonchlorine isentropic exponent isothermal compression
IT   Hydrocarbons, properties
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (fluoro; strengths of non-chlorine refrigerants and their influence on
        process organization)
IT   Entropy
        (isentropic exponent; strengths of non-chlorine refrigerants and their
        influence on process organization)
IT   Compressibility
        (isothermal; strengths of non-chlorine refrigerants and their influence
        on process organization)
IT   Refrigerants
       Refrigeration
        (strengths of non-chlorine refrigerants and their influence on process
        organization)
IT   75-10-5, R32   75-45-6, R22   124-38-9, Carbon dioxide, properties
     354-33-6, R125 420-46-2, R143a 811-97-2, R134a
     7664-41-7, Ammonia, properties   133023-17-3, R410a   150621-87-7, R507
     150743-07-0, R404a   158675-78-6, R407c
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (strengths of non-chlorine refrigerants and their influence on process
        organization)
RE.CNT  8     THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
```

```
(1) Forster, H; Die Kalte und Klimatechnik 2001, V54(6), PS40
(2) Forster, H; Kl Luft- und Kaltetechnik 1999, V35(7), PS356
(3) Forster, H; Kosten und Umweltentlastung fur die industrielle Kalteerzeugung
    1999, PS16
(4) Frolich, M; Spektrum der Gebaudetechnik 2000, 3, PS74
(5) Huelle, Z; Energieverbrauch ist kalkulierbar (Kosteneinsparung bei
    Kalteanlagen) CCI 1997, V31(5), PS44
(6) Huelle, Z; Kl Luft- und Kaltetechnik 1998, V34(5), PS241
(7) Petrak, M; Kl Luft- und Kaltetechnik 2004, V40(3), PS104
(8) Petrak, M; Kl Luft- und Kaltetechnik 2004, V40(2), PS62
```


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L15  ANSWER 29 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2005:258664  CAPLUS
DN   142:299850
ED   Entered STN:  25 Mar 2005
TI   Composition based on hydrofluorocarbons and its use in
     refrigeration and/or air conditioning, and heat transfer system
     containing it
```

IN Guilpain, Gerard; Caron, Laurent
PA Arkema, Fr.
SO Fr. Demande, 13 pp.
CODEN: FRXXBL
DT Patent
LA French
IC ICM C09K005-04
CC 45-5 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	FR 2860001	A1	20050325	FR 2003-11025	20030919
	FR 2860001	B1	20080215		
	WO 2005028586	A2	20050331	WO 2004-FR2231	20040902
	WO 2005028586	A3	20050630		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	EP 1664234	A2	20060607	EP 2004-787286	20040902

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	CN 1852963	A	20061025	CN 2004-80027155	20040902
	JP 2007505963	T	20070315	JP 2006-526657	20040902
	US 20070187638	A1	20070816	US 2006-570938	20061222
PRAI	FR 2003-11025	A	20030919		
	WO 2004-FR2231	W	20040902		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
FR 2860001	ICM	C09K005-04
	IPCI	C09K0005-00 [I,C]; C09K0005-04 [I,A]
	IPCR	C09K0005-00 [I,C]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
WO 2005028586	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
EP 1664234	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
CN 1852963	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]
	IPCR	C09K0005-00 [I,C]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
JP 2007505963	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]; F25B0001-00 [I,A]
	IPCR	C09K0005-00 [I,C]; C09K0005-04 [I,A]; F25B0001-00 [I,C]; F25B0001-00 [I,A]
US 20070187638	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]
	NCL	252/067.000

AB The composition comprises R-32 (difluoromethane) 1-50, R-125 (pentafluoroethane) 10-90, R-134a (1,1,1,2-tetrafluoroethane) 1-50, and R-143a (1,1,1-trifluoroethane) 5-20%.
ST refrigeration air conditioning hydrofluorocarbon compn; heat transfer system hydrofluorocarbon compn; difluoromethane pentafluoroethane tetrafluoroethane trifluoroethane refrigeration compn

IT   Air conditioning
     Heat exchangers
     Refrigerants
       Refrigerating apparatus
       Refrigeration
        (composition based on hydrofluorocarbons and its use in
        refrigeration and/or air conditioning, and heat transfer system
        containing it)
IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro; composition based on hydrofluorocarbons and its use in
        refrigeration and/or air conditioning, and heat transfer system
        containing it)
IT   75-10-5, R-32 354-33-6, R-125 420-46-2, R-143a
     811-97-2, R-134a
     RL: TEM (Technical or engineered material use); USES (Uses)
        (composition based on hydrofluorocarbons and its use in
        refrigeration and/or air conditioning, and heat transfer system
        containing it)
IT   74-98-6, Propane, uses   75-00-3, Ethyl chloride   75-28-5, Isobutane
     106-97-8, Butane, uses   115-07-1, Propylene, uses   115-10-6, Dimethyl
     ether   124-38-9, Carbon dioxide, uses   156-60-5, trans-1,2-
     Dichloroethylene
     RL: NUU (Other use, unclassified); USES (Uses)
        (rinsing solution; composition based on hydrofluorocarbons and its use in
        refrigeration and/or air conditioning, and heat transfer system
        containing it)
RE.CNT 7   THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Allied Signal Inc; WO 9411459 A 1994 CAPLUS
(2) Anon; PATENT ABSTRACTS OF JAPAN 1996, V1996(08)
(3) Asahi Glass Co Ltd; JP 08100170 A 1996 CAPLUS
(4) Asahi Glass Co Ltd; JP 8100170 A 1996
(5) Bkt Bonnet Kaeltetechnik Gmbh; EP 1072850 A 2001
(6) Daikin Ind Ltd; EP 0979855 A 2000 CAPLUS
(7) Ici Plc; EP 0536940 A 1993 CAPLUS

L15 ANSWER 30 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   2005:96902 CAPLUS
DN   142:394292
ED   Entered STN: 04 Feb 2005
TI   An algorithmic approach towards finding better refrigerant substitutes of
     CFCs in terms of the second law of thermodynamics
AU   Arcaklioglu, Erol; Cavusoglu, Abdullah; Erisen, Ali
CS   Department of Mechanical Engineering, Faculty of Engineering, Kirikkale
     University, Yahsihan, Kirikkale, 71450, Turk.
SO   Energy Conversion and Management (2005), 46(9-10), 1595-1611
     CODEN: ECMADL; ISSN: 0196-8904
PB   Elsevier Ltd.
DT   Journal
LA   English
CC   48-5 (Unit Operations and Processes)
AB   In this study, rational efficiency (RE) and component based
     irreversibility ratios of a cooling system based on the second law of
     thermodn. using HFC and HC based pure refrigerants, such as, R32, R125,
     R134a, R143a, R152a, R290, R600a and their binary and ternary mixts.,
     along with R12, R22 and R502 (i.e. CFCs) have been numerically calculated The
     effect of temperature glide, occurring at the condenser and evaporator, on the
     RE of the cooling system has been evaluated. The calcns. are based on a
     constant cooling load on a cooling system with suction/line heat exchanger
     (SLHE). To be able to calculate the performance of the cooling system, an
     algorithm that uses the state point properties provided by REFPROP has

been employed. We have targeted finding better mixture substitutes in terms of rational efficiency. For example, despite the suggestions in the literature; for R22, the mass percentage level of 20/80 of R32/R134a has provided the best RE level. The highest irreversibility (in percentages) is found at the condenser. The results also suggest that for both binary and ternary mixts., a general trend of increases in RE level is observed against temperature glide increases occurring at this system component.

ST rational efficiency irreversibility ratio refrigerant chlorofluorocarbon replacement

IT Algorithm
Refrigerants
Refrigeration
(algorithmic approach for finding better refrigerant substitutes of chlorofluorocarbons in terms of second law of thermodn.)

IT Thermodynamics
(second law; algorithmic approach for finding better refrigerant substitutes of chlorofluorocarbons in terms of second law of thermodn.)

IT 74-98-6, R290, uses 75-10-5, R32 75-28-5, R600a 75-37-6, R152a 75-45-6, R22 75-71-8, R12 354-33-6, R125 420-46-2, R143a 811-97-2, R134a 39432-81-0, R502
RL: TEM (Technical or engineered material use); USES (Uses)
(rational efficiency and component based irreversibility ratio of cooling system based on second law of thermodn. using hydrofluorocarbon and hydrocarbon based pure refrigerants and their binary and ternary mixts.)

RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Aprea, C; Int J Refrig 1996, V19, P257 CAPLUS
(2) Barolo, M; Int J Refrig 1995, V18, P550 CAPLUS
(3) CEngel, Y; Thermodynamics: an engineering approach. second ed 1994
(4) Camporese, R; Int J Refrig 1997, V20, P22 CAPLUS
(5) Chaturvedi, S; Energy 1991, V16, P941 CAPLUS
(6) Churi, N; Comp Chem Eng 1997, V21, P349
(7) Comakli, O; Energy Convers Manage 1999, V40, P193 CAPLUS
(8) Devotta, S; Int J Refrig 1993, V16, P84 CAPLUS
(9) Domanski, P; Int J Refrig 1994, V17, P226 CAPLUS
(10) Haselden, G; Int J Refrig 1994, V17, P343 CAPLUS
(11) Jung, D; Int J Refrig 1991, V14, P223 CAPLUS
(12) Jung, D; Int J Refrig 1999, V22, P558 CAPLUS
(13) Kim, M; J Energy Res Technol 1994, V116, P148
(14) Kotas, T; The exergy method of thermal plant analysis 1985
(15) Liang, H; Energy 1991, V16, P883 CAPLUS
(16) McLinden, M; Int J Refrig 1987, V10, P318 CAPLUS
(17) Nagel, M; Int J Refrig 1995, V18, P534 CAPLUS
(18) Richardson, R; Int J Refrig 1995, V18, P58 CAPLUS
(19) Rohlin, P; PhD Thesis, The Royal Institute of Technology 1996
(20) Stegou-Sagia, A; Energy Convers Manage 2000, V41, P1345 CAPLUS
(21) Zubair, S; Int J Refrig 1996, V19, P506 CAPLUS

AN 2005:21606 CAPLUS
DN 142:76832
ED Entered STN: 11 Jan 2005
TI New measurements of pool boiling heat transfer with hydrocarbons and other organics for update of VDI-Heat Atlas calculation method
AU Gorenflo, D.; Kotthoff, S.; Chandra, U.
CS Thermodynamik & Energietechnik, Universitaet Paderborn, Germany
SO Natural Working Fluids 2004, IIR-Gustav Lorentzen Conference, 6th, Glasgow, United Kingdom, Aug. 29-Sept. 1, 2004 (2004), Meeting Date 2004, 118-127 Publisher: International Institute of Refrigeration, Paris, Fr. CODEN: 69GAH6; ISBN: 2-913149-34-0
DT Conference; (computer optical disk)

LA English
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 47

AB Reliable prediction of nucleate pool boiling heat transfer is important for safe design of large evaporators in refrigeration and air conditioning, and in many other com. and industrial fields. As a theor. consistent calcn. method for the heat-transfer coefficient in nucleate boiling does not yet exist, the predictive methods available at present are empirical or semiempirical, particularly for heat transfer conditions relevant in practice. One of these is the method proposed in VDI-Heat Atlas that will be completely revised in the near future. In the course of this revision, new expts. of pool boiling heat transfer from a single horizontal copper tube (8 mm diameter) to hydrocarbons and alcs. were performed within wide ranges of saturation pressure and heat flux. The results confirm the outlines of the calcn. method but also the common trend of other recent measurements indicating that some of the empirical correlations included in the calcn. method should be updated.

ST pool boiling heat transfer hydrocarbon org compd measurement; VDI Heat Atlas update refrigerant boiling heat transfer calcn; evaporator refrigeration air conditioning design boiling heat transfer

IT Air conditioning
Evaporators
Refrigeration
(design of evaporators for refrigeration and air conditioning systems)

IT Heat transfer
Refrigerants
(measurements of pool boiling heat transfer of hydrocarbons and organic compds. for update of VDI-Heat Atlas calcn. method)

IT Hydrocarbons, uses
Organic compounds, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(measurements of pool boiling heat transfer of hydrocarbons and organic compds. for update of VDI-Heat Atlas calcn. method)

IT Boiling
(nucleate pool; measurements of pool boiling heat transfer of hydrocarbons and organic compds. for update of VDI-Heat Atlas calcn. method)

IT 64-17-5, Ethanol, uses 67-63-0, 2-Propanol, uses 71-23-8, n-Propanol, uses 74-98-6, Propane, uses 75-10-5, R32, Refrigerant 75-28-5, Iso-butane 75-37-6, R152a 78-92-2, 2-Butanol 106-97-8, n-Butane, uses 109-66-0, n-Pentane, uses 142-82-5, n-Heptane, uses 354-33-6, R125 420-46-2, R143a 431-89-0, R227Ea 811-97-2, R134a
RL: TEM (Technical or engineered material use); USES (Uses)
(design of evaporators for refrigeration and air conditioning systems)

RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Bier, K; Chem Ing Techn 1973, V45, P935 CAPLUS
(2) Bier, K; Int J Refrig 1990, V13, P293 CAPLUS
(3) Bier, K; VDI-Bericht 1977, V290, P467
(4) Fritz, W; VDI-Warmeatlas, 1. Auflage 1963
(5) Gorenflo, D; Int J Refrig 2004, V27, P492 CAPLUS
(6) Gorenflo, D; VDI-Warmeatlas, 4. Auflage 1984
(7) Gorenflo, D; VDI-Warmeatlas, 9. Auflage 2002
(8) Haffner, H; Warmeubergang an Kaltemittel bei Blasenverdampfung, Filmverdampfung und uberkritischem Zustand des Fluids 1970, BMBW-FB K 70-24
(9) Knabe, V; Diss, Univ (GH) Paderborn 1984, Forschungsbericht d Deutsch Kaltetechn Ver Nr 10
(10) Kotthoff, S; 6th IIR-Gustav Lorentzen Conf 2004, paper #2/A/3.30
(11) Lemmon, E; NIST Standard Reference Database 23, Version 7.0 2002

(12) Luke, A; Diss, Univ (GH) Paderborn 1996
(13) McGarry, J; Ind Eng Chem Process Des Dev 1983, V22, P313 CAPLUS
(14) Nishikawa, K; Proc 7th Int Heat Transfer Conf 1982, V4, P61 CAPLUS
(15) Reid, R; The properties of gases & liquids, 4th Edition 1988
(16) Ruthlein, H; Diss, Univ Karlsruhe (TH) 1984
(17) Salem, M; Diss, Univ Karlsruhe (TH) 1979
(18) Schomann, H; Diss, Univ (GH) Paderborn 1994
(19) Span, R; Int J Thermophysics 2002, V24, P41
(20) Stephan, K; Abh d Deutsch Kaltetechn Ver 1964, 18
(21) Stephan, K; Chem-Ing Techn MS 1979, P649
(22) Tanes, Y; Diss, Univ Karlsruhe (TH) 1976

```
L15  ANSWER 32 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2004:934345  CAPLUS
DN   141:380876
ED   Entered STN:  06 Nov 2004
TI   Low loss foam composition and cable having low loss foam
     layer
IN   Champagne, Michel F.; Gendron, Richard; Vachon, Caroline; Chopra, Vijay
     K.; Nudd, Hugh R.; Rampalli, Sitaram
PA   Can.
SO   U.S. Pat. Appl. Publ., 9 pp.
     CODEN: USXXCO
DT   Patent
LA   English
IC   ICM  C08J009-00
INCL 521050000
CC   38-3 (Plastics Fabrication and Uses)
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
     ---------------     ----   --------   --------------------   --------
PI   US 20040220287       A1    20041104   US 2003-472341         20030922
     CA 2523861           A1    20041104   CA 2003-2523861        20030424
     WO 2004094526        A1    20041104   WO 2003-CA591          20030424
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,
             CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,
             GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,
             LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM,
             PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT,
             TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
         RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY,
             KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES,
             FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR,
             BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG
     AU 2003226992        A1    20041119   AU 2003-226992         20030424
     EP 1618150           A1    20060125   EP 2003-816666         20030424
     EP 1618150           B1    20080213
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK
     CN 1788047           A     20060614   CN 2003-826669         20030424
     BR 2003018277        A     20060829   BR 2003-18277          20030424
     JP 2006524265        T     20061026   JP 2004-571014         20030424
     AT 386076            T     20080315   AT 2003-816666         20030424
     ES 2300665           T3    20080616   ES 2003-816666         20030424
     MX 2005PA11367       A     20060519   MX 2005-PA11367        20051021
     IN 2005CN03141       A     20070608   IN 2005-CN3141         20051124
PRAI WO 2003-CA591        W     20030424
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 US 20040220287  ICM    C08J009-00
                 INCL   521050000
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                IPCI   C08J0009-00 [ICM,7]
                IPCR   C08J0009-00 [I,C*]; C08J0009-12 [I,A]; C08L0023-00
                       [I,C*]; C08L0023-06 [I,A]; C08L0023-08 [N,A];
                       C08L0023-10 [N,A]
                NCL    521/050.000
                ECLA   C08J009/12F; C08J009/12F+L23/02; C08L023/06+B2A
CA 2523861      IPCI   C08J0009-00 [I,A]; C08J0009-12 [I,A]; C08L0023-06
                       [I,A]; C08L0023-12 [I,A]; C08L0023-16 [I,A];
                       C08L0023-00 [I,C*]
                IPCR   C08J0009-00 [I,C]; C08J0009-00 [I,A]; C08J0009-12
                       [I,A]; C08L0023-00 [I,C]; C08L0023-06 [I,A];
                       C08L0023-08 [N,A]; C08L0023-10 [N,A]; C08L0023-12
                       [I,A]; C08L0023-16 [I,A]
WO 2004094526   IPCI   C08L0023-06 [ICM,7]; C08L0023-12 [ICS,7]; C08L0023-16
                       [ICS,7]; C08L0023-00 [ICS,7,C*]; C08J0009-12 [ICS,7];
                       C08J0009-00 [ICS,7]
                IPCR   C08J0009-00 [I,C*]; C08J0009-12 [I,A]; C08L0023-00
                       [I,C*]; C08L0023-06 [I,A]; C08L0023-08 [N,A];
                       C08L0023-10 [N,A]
                ECLA   C08J009/12F; C08J009/12F+L23/02; C08L023/06+B2A; M08L;
                       M08L
AU 2003226992   IPCI   C08L0023-06 [ICM,7]; C08L0023-12 [ICS,7]; C08L0023-16
                       [ICS,7]; C08L0023-00 [ICS,7,C*]; C08J0009-12 [ICS,7];
                       C08J0009-00 [ICS,7]
                IPCR   C08J0009-00 [I,C*]; C08J0009-12 [I,A]; C08L0023-00
                       [I,C*]; C08L0023-06 [I,A]; C08L0023-08 [N,A];
                       C08L0023-10 [N,A]
EP 1618150      IPCI   C08L0023-00 [I,C]; C08L0023-06 [I,A]; C08J0009-00
                       [I,C]; C08J0009-00 [I,A]; C08J0009-12 [I,A];
                       C08L0023-12 [I,A]; C08L0023-16 [I,A]
                IPCR   C08L0023-08 [N,A]; C08L0023-10 [N,A]
                ECLA   C08J009/12F; C08J009/12F+L23/02; C08L023/06+B2A; M08L;
                       M08L
CN 1788047      IPCI   C08L0023-06 [I,A]; C08L0023-12 [I,A]; C08L0023-16
                       [I,A]; C08L0023-00 [I,C*]; C08J0009-12 [I,A];
                       C08J0009-00 [I,A]
                IPCR   C08L0023-00 [I,C]; C08L0023-06 [I,A]; C08J0009-00
                       [I,C*]; C08J0009-12 [I,A]; C08L0023-08 [N,A];
                       C08L0023-10 [N,A]
                ECLA   C08J009/12F; C08J009/12F+L23/02; C08L023/06+B2A
BR 2003018277   IPCI   C08L0023-06 [ICS,7]; C08J0009-00 [ICS,7]; C08J0009-12
                       [ICS,7]; C08L0023-12 [ICS,7]; C08L0023-16 [ICS,7];
                       C08L0023-00 [ICS,7,C*]
                IPCR   C08L0023-00 [I,C*]; C08L0023-06 [I,A]; C08L0023-08
                       [N,A]; C08L0023-10 [N,A]
                ECLA   C08J009/12F; C08J009/12F+L23/02; C08L023/06+B2A
JP 2006524265   IPCI   C08J0009-14 [I,A]; C08J0009-00 [I,C*]; H01B0003-44
                       [I,A]; H01B0013-00 [I,A]; H01B0011-18 [I,A];
                       H01B0007-17 [I,A]; H01B0007-02 [I,A]
                IPCR   C08J0009-00 [I,C]; C08J0009-14 [I,A]; C08J0009-12
                       [I,A]; C08L0023-00 [I,C*]; C08L0023-06 [I,A];
                       C08L0023-08 [N,A]; C08L0023-10 [N,A]; H01B0003-44
                       [I,C]; H01B0003-44 [I,A]; H01B0007-02 [I,C];
                       H01B0007-02 [I,A]; H01B0007-17 [I,C]; H01B0007-17
                       [I,A]; H01B0011-18 [I,C]; H01B0011-18 [I,A];
                       H01B0013-00 [I,C]; H01B0013-00 [I,A]
                FTERM  4F074/AA18; 4F074/AA20; 4F074/AA21; 4F074/AA98;
                       4F074/BA32; 4F074/BA33; 4F074/BA53; 4F074/BA54;
                       4F074/BA55; 4F074/BA56; 4F074/BA57; 4F074/BA58;
                       4F074/BA67; 4F074/BA95; 4F074/BC12; 4F074/BC13;
                       4F074/CA22; 4F074/CA24; 4F074/CC03X; 4F074/CC04X;
                       4F074/DA02; 4F074/DA13; 4F074/DA48; 5G305/AA02;
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5G305/AB10; 5G305/BA12; 5G305/CA01; 5G305/CD20; 5G313/AB05; 5G313/AC03; 5G319/FA03; 5G319/FC15

AT 386076	IPCI	C08L0023-00 [I,C]; C08L0023-06 [I,A]; C08J0009-00 [I,C]; C08J0009-00 [I,A]; C08J0009-12 [I,A]; C08L0023-12 [I,A]; C08L0023-16 [I,A]
	IPCR	C08L0023-00 [I,C]; C08L0023-06 [I,A]; C08J0009-00 [I,C]; C08J0009-00 [I,A]; C08J0009-12 [I,A]; C08L0023-08 [N,A]; C08L0023-10 [N,A]; C08L0023-12 [I,A]; C08L0023-16 [I,A]
	ECLA	C08J009/12F; C08J009/12F+L23/02; C08L023/06+B2A; M08L; M08L
ES 2300665	IPCI	C08L0023-00 [I,C]; C08L0023-06 [I,A]; C08J0009-00 [I,C]; C08J0009-00 [I,A]; C08J0009-12 [I,A]; C08L0023-12 [I,A]; C08L0023-16 [I,A]
	IPCR	C08L0023-08 [N,A]; C08L0023-10 [N,A]
	ECLA	C08J009/12F; C08J009/12F+L23/02; C08L023/06+B2A; M08L; M08L
MX 2005PA11367	IPCI	C08J0009-00 [ICM,7]; C08J0009-12 [ICS,7]; C08L0023-06 [ICS,7]; C08L0023-12 [ICS,7]; C08L0023-16 [ICS,7]; C08L0023-00 [ICS,7,C*]
	ECLA	C08J009/12F; C08J009/12F+L23/02; C08L023/06+B2A; M08L; M08L
IN 2005CN03141	IPCI	C08L0023-06 [ICM,7]; C08L0023-00 [ICM,7,C*]

AB The invention relates to a low loss foam composition and cable, such as a coaxial cable. The foam composition is formed by heating an olefinic polymer, such as a high d. polyethylene, medium d. polyethylene, low d. polyethylene, linear low d. polyethylene, polypropylene, or a combination thereof, into a molten state composition, optionally with a nucleating agent. The molten mixture is extruded under pressure through a die with a blowing agent comprising an atmospheric gas, such as carbon dioxide, nitrogen or air, and a co-blowing agent selected from hydrofluorocarbons, hydrochlorofluorocarbons, or perfluoro compds., such as HFC-134a. The cable is formed by extruding the foam composition onto a signal carrying conductor and sheathing the foam-coated signal carrying conductor in an appropriate conducting shield.

ST low loss polyolefin foam compn elec cable

IT Air
(blowing agent; low loss foam composition and cable having low loss foam layer)

IT Hydrocarbons, uses
RL: NUU (Other use, unclassified); USES (Uses)
(chlorofluorocarbons, co-blowing agent; low loss foam composition and cable having low loss foam layer)

IT Perfluoro compounds
RL: NUU (Other use, unclassified); USES (Uses)
(co-blowing agent; low loss foam composition and cable having low loss foam layer)

IT Hydrocarbons, uses
RL: NUU (Other use, unclassified); USES (Uses)
(fluoro, co-blowing agent; low loss foam composition and cable having low loss foam layer)

IT Extrusion of plastics and rubbers
(low loss foam composition and cable having low loss foam layer)

IT Linear low density polyethylenes
Polyolefins
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(low loss foam composition and cable having low loss foam layer)

IT Electric cables

(low loss; low loss foam composition and cable having low loss foam layer)

IT 124-38-9, Carbon dioxide, uses 7727-37-9, Nitrogen, uses
RL: NUU (Other use, unclassified); USES (Uses)
(blowing agent; low loss foam composition and cable having low loss foam layer)

IT 75-10-5, Difluoromethane 75-37-6, 1,1-Difluoroethane 75-45-6, Chlorodifluoromethane 75-68-3, 1-Chloro-1,1-difluoroethane 75-73-0, Perfluoromethane 76-16-4, Perfluoroethane 76-19-7, HFC-218 115-25-3, Octafluorocyclobutane 306-83-2, 1,1-Dichloro-2,2,2-trifluoroethane 353-36-6, HFC-161 354-33-6, Pentafluoroethane 359-35-3, HFC-134 406-58-6, 1,1,1,3,3-Pentafluorobutane 420-46-2, 1,1,1-Trifluoroethane 421-07-8, HFC-263fb 430-61-5, HFC-272fb 430-66-0, HFC-143 431-89-0, HFC-227ea 460-73-1, 1,1,1,3,3-Pentafluoropropane 690-39-1, 1,1,1,3,3,3-Hexafluoropropane 811-97-2, HFC-134a 1717-00-6, 1,1-Dichloro-1-fluoroethane 2551-62-4, Sulfur hexafluoride 2837-89-0, 1-Chloro-1,2,2,2-tetrafluoroethane 138495-42-8, 1,1,1,2,3,4,4,5,5,5-Decafluoropentane
RL: NUU (Other use, unclassified); USES (Uses)
(co-blowing agent; low loss foam composition and cable having low loss foam layer)

IT 9002-88-4, Polyethylene
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(high d., medium d., low d.; low loss foam composition and cable having low loss foam layer)

IT 9003-07-0, Polypropylene
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(low loss foam composition and cable having low loss foam layer)

IT 123-77-3, Azodicarbonamide
RL: MOA (Modifier or additive use); USES (Uses)
(nucleating agent masterbatch; low loss foam composition and cable having low loss foam layer)

L15 ANSWER 33 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN

AN 2004:897162 CAPLUS

DN 142:486254

ED Entered STN: 28 Oct 2004

TI Emission profiles from the foam and refrigeration sectors comparison with atmospheric concentrations. Part 2: results and discussion

AU Ashford, P.; Clodic, D.; McCulloch, A.; Kuijpers, L.

CS Caleb Management Services, Bristol, UK

SO International Journal of Refrigeration (2004), 27(7), 701-716
CODEN: IJRFDI; ISSN: 0140-7007

PB Elsevier Ltd.

DT Journal

LA English

CC 59-2 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 48

AB The modeling of consumption and emissions of ozone depleting chems. and greenhouse gases was a challenge for the communities of both the Montreal and Kyoto Protocols. One of the particular challenges was the representative modeling of consumption in sectors with substantial delays in emission and the resulting accumulation of banks'. Several experts, including the authors of this paper, were active in building databases of sources over the last 5 yr and have continued to refine ests. as new information has come to light. The decision of the Inter-Governmental

Panel on Climate Change to commission a Special Report on factors influencing the interface between the two Protocols has acted as a stimulus to draw conclusions from the current state of knowledge. This paper is the product of this initiative as it relates to two key sectors of delayed emission: refrigeration equipment and insulating foams. As the title indicates, the paper documents the development of consumption, banks and emissions for both sectors and uses these to develop ests. of anticipated atmospheric concentration These ests. are then compared with measured atmospheric concns. to evaluate the appropriateness of the modeling approaches used and to identify areas where discrepancies remain. Efforts were made to explain these discrepancies wherever possible, but it is recognized that the process remains one of continuous refinement. The major findings of the work are that emissions of refrigerants and foam blowing agents will continue well beyond the scope of the current study (1990-2015), with banks of 2.5 and 3 million tons, resp., remaining at 2015. However, the composition of each bank is very different because of the more rapid turnover in the refrigeration sector led by higher emission rates and shorter product lifetimes. This means that the CFC component of some blowing agent banks may provide a significant target for reducing climate change impact of future emissions where tech. and economic criteria are met. For the refrigeration sector better containment, recovery at end of life, re-use or destruction, but also change of refrigerant are the key options. There is clear evidence that the atmospheric concentration predictions for those fluorinated compds. predominantly used as blowing agents are less certain. This is partially because of the high dependence of the prediction on the emission functions assumed during the long use phase. A small variance can have a significant impact on the outcome. There are also continuing uncertainties about end-of-life scenarios for major market sectors such as the US domestic refrigerator sector. These areas are the focus of continuing study.

ST emission blowing agent refrigerant greenhouse gas modeling ozone destruction

IT Hydrocarbons, occurrence
RL: NUU (Other use, unclassified); POL (Pollutant); OCCU (Occurrence); USES (Uses)
(chlorofluorocarbons; emission profiles from foam and refrigeration sectors comparison with atmospheric concns.)

IT Blowing agents
Environmental modeling
Greenhouse gases
Refrigerants
(emission profiles from foam and refrigeration sectors comparison with atmospheric concns.)

IT Hydrocarbons, occurrence
RL: NUU (Other use, unclassified); POL (Pollutant); OCCU (Occurrence); USES (Uses)
(fluoro; emission profiles from foam and refrigeration sectors comparison with atmospheric concns.)

IT Air pollution
(photochem.; emission profiles from foam and refrigeration sectors comparison with atmospheric concns.)

IT 75-10-5, r-32 75-37-6, r-152a 75-45-6, r-22 75-69-4, r-11 75-71-8, r-12 76-15-3, r-115 306-83-2, r-123 354-33-6, r-125 406-58-6, Hfc-365mfc 420-46-2, r-143a 431-89-0, Hfc-227ea 460-73-1, Hfc-245fa 811-97-2, r-134a 2837-89-0, r-124
RL: NUU (Other use, unclassified); POL (Pollutant); OCCU (Occurrence); USES (Uses)
(emission profiles from foam and refrigeration

sectors comparison with atmospheric concns.)
IT 10028-15-6, Ozone, occurrence
RL: GOC (Geological or astronomical occurrence); OCCU (Occurrence) (stratospheric depletion of; emission profiles from foam and refrigeration sectors comparison with atmospheric concns.)
RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Afeas; www.afeas.org 2003
(2) Agage; ftp://cdiac.esd.ornl.gov/pub/ale_gage_Agage 2004
(3) Anon; Climate Change 1995 The science of climate change Contribution of Working Group 1 to the Second Assessment Report of the Intergovernmental Panel on Climate Change 2001
(4) Anon; Climate Change 2001 The scientific basis Contribution of Working Group 1 to the Third Assessment Report of the Intergovernmental Panel on Climate Change 2001
(5) Anon; Official Journal of the European Communities 2000, L244/1
(6) Anon; ` Statistical Annexes to the Global Report on Human Settlements 2001' 2002
(7) Ashford, P; Int J Refrigeration 2004
(8) Ashford, P; Report for US EPA and ADEME 2004
(9) Cefic; Data submitted to the Commission of the European Communities in pursuance of Community Regulation EC 2037/2000 2003
(10) Cmdl; http://www.cmdl.noaa.gov 2004
(11) McCulloch, A; Atmos Environ 2003, V37(7), P889 CAPLUS
(12) Montzka, S; Report No 47 2003
(13) Nakicenovic, N; Special Report on Emission Scenarios, Report of Working Group III of the Intergovernmental Panel on Climate Change 2000
(14) Oram, D; Geophys Res Lett 1996, V23(15), P1949 CAPLUS
(15) Palandre, L; Estimation of the world-wide fleets of refrigerating and air-conditioning equipment in order to determine forecasts of refrigerant emissions 2003
(16) Palandre, L; Final Report for GGEEC and ADEME 2002
(17) Palandre, L; Report for ADEME and US EPA 2004
(18) Unep; Production and consumption of ozone depleting substances under the Montreal protocol 2002
(19) Unep Foams Technical Options Committee; ` 2002 Rigid and Flexible Foam Report' 2003
(20) Unfccc; www.unfccc.de 2003

L15 ANSWER 34 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2004:884740 CAPLUS
DN 141:381529
ED Entered STN: 25 Oct 2004
TI Simple correlations for saturated liquid and vapor densities of pure fluids
AU Chouaieb, O.; Ghazouani, J.; Bellagi, A.
CS Departement Genie Energetique, Ecole Nationale d'Ingenieurs de Monastir, Monastir, 5060, Tunisia
SO Thermochimica Acta (2004), 424(1-2), 43-51
CODEN: THACAS; ISSN: 0040-6031
PB Elsevier B.V.
DT Journal
LA English
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 65
AB Two correlations for the saturated liquid and vapor densities of pure substances
particularly those used as working fluids in refrigeration machines are proposed. They are shown to represent well the reduced d. as a function of the reduced temperature ranging from 0.5-1. For about 30 pure substances with acentric factor and critical compressibility factor varying in a wide range, the correlations predict accurately the saturation densities.

ST   refrigerant satd liq vapor density correlation
IT   Density
     Refrigerants
        (correlations for saturated liquid and vapor densities of pure fluids)
IT   74-82-8, Methane, properties   74-84-0, Ethane, properties   74-98-6, Propane, properties 75-10-5, r32, Refrigerant   75-28-5, Iso-butane   75-37-6, R152a   75-45-6   106-97-8, n-Butane, properties 110-54-3, Hexane, properties   124-38-9, Carbon dioxide, properties 142-82-5, Heptane, properties   306-83-2, R123 354-33-6, R125 420-46-2, R143a   630-08-0, Carbon monoxide, properties 811-97-2, R134a   1333-74-0, Hydrogen, properties   2837-89-0, R124   7439-90-9, Krypton, properties   7440-01-9, Neon, properties 7440-37-1, Argon, properties   7440-63-3, Xenon, properties   7664-41-7, Ammonia, properties   7727-37-9, Nitrogen, properties   7732-18-5, Water, properties   7782-39-0, Deuterium, properties   7782-41-4, Fluorine, properties   7782-44-7, Oxygen, properties   7783-54-2, Nitrogen fluoride (NF3)
     RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
        (correlations for saturated liquid and vapor densities of pure fluids)
RE.CNT 9   THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; http://webbook.nist.gov/chemistry/
(2) Cibulka, I; Fluid Phase Equilibria 1993, V89, P1 CAPLUS
(3) Daroux, M; Analyse Numerique Appliquee 1991
(4) Deiters, U; AIChE J 2002, V48, P882 CAPLUS
(5) Reid, R; The Properties of Gases and Liquids, 4th ed 1987
(6) The International Association for the Properties of Water and Steam; Revised Supplementary Release on Saturation Properties of Ordinary Water Substance 1992
(7) Tillner-Roth, R; Fundamental Equations of State 1998
(8) Twu, C; Getting a Handle on Advanced Cubic Equations of State 2002, P58 CAPLUS
(9) Vidal, J; Thermodynamique: Application au Genie Chimique et a L'industrie Petroliere 1997

L15 ANSWER 35 OF 175 CAPLUS
AN   2004:591913 CAPLUS
DN   141:125422
ED   Entered STN: 25 Jul 2004
TI   Compositions containing fluorohydrocarbons or fluorinated and oxygenated solvents for cleaning and drying surfaces
IN   Artuphel, Benoit; Lallier, Jean Pierre; Rastelletti, Emmanuel
PA   Atofina, Fr.
SO   Fr. Demande, 17 pp.
     CODEN: FRXXBL
DT   Patent
LA   French
IC   ICM C11D007-30
     ICS C11D007-50; B08B003-08; H05K003-26
CC   46-6 (Surface Active Agents and Detergents)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	FR 2850114	A1	20040723	FR 2003-529	20030117
	FR 2850114	B1	20050218		
	CA 2505981	A1	20040826	CA 2004-2505981	20040113
	WO 2004072218	A1	20040826	WO 2004-FR49	20040113

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI

RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE,
BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU,
MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG
EP 1583815 A1 20051012 EP 2004-701620 20040113
EP 1583815 B1 20060705
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK
CN 1738894 A 20060222 CN 2004-80002333 20040113
JP 2006516296 T 20060629 JP 2005-518320 20040113
AT 332357 T 20060715 AT 2004-701620 20040113
ES 2268617 T3 20070316 ES 2004-701620 20040113
US 20060052268 A1 20060309 US 2005-535691 20050519
PRAI FR 2003-529 A 20030117
WO 2004-FR49 W 20040113
CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
FR 2850114	ICM	C11D007-30
	ICS	C11D007-50; B08B003-08; H05K003-26
	IPCI	C11D0007-30 [ICM,7]; C11D0007-22 [ICM,7,C*]; C11D0007-50 [ICS,7]; B08B0003-08 [ICS,7]; H05K0003-26 [ICS,7]
	IPCR	B08B0003-04 [I,C*]; B08B0003-04 [I,A]; B08B0003-08 [I,C*]; B08B0003-08 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-10 [I,A]; C11D0007-22 [N,C*]; C11D0007-26 [N,A]; C11D0007-28 [N,A]; C11D0007-34 [N,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]
	ECLA	B08B003/04; B08B003/08; C09K003/30; C09K005/10; C11D007/50A2
CA 2505981	IPCI	C11D0007-50 [ICM,7]; C09K0005-04 [ICS,7]; C09K0005-00 [ICS,7,C*]; B08B0003-08 [ICS,7]; C11D0007-26 [ICS,7]; H05K0003-26 [ICS,7]; C11D0007-28 [ICS,7]; C11D0007-34 [ICS,7]; C11D0007-22 [ICS,7,C*]
	IPCR	B08B0003-04 [I,C*]; B08B0003-04 [I,A]; B08B0003-08 [I,C*]; B08B0003-08 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-10 [I,A]; C11D0007-22 [N,C*]; C11D0007-26 [N,A]; C11D0007-28 [N,A]; C11D0007-34 [N,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]
	ECLA	B08B003/04; B08B003/08; C09K003/30; C09K005/10; C11D007/50A2
WO 2004072218	IPCI	C11D0007-50 [ICM,7]; C09K0005-04 [ICS,7]; C09K0005-00 [ICS,7,C*]; B08B0003-08 [ICS,7]; H05K0003-26 [ICS,7]; C11D0007-34 [ICS,7]; C11D0007-28 [ICS,7]; C11D0007-26 [ICS,7]; C11D0007-22 [ICS,7,C*]
	IPCR	B08B0003-04 [I,C*]; B08B0003-04 [I,A]; B08B0003-08 [I,C*]; B08B0003-08 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-10 [I,A]; C11D0007-22 [N,C*]; C11D0007-26 [N,A]; C11D0007-28 [N,A]; C11D0007-34 [N,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]
	ECLA	B08B003/04; B08B003/08; C09K003/30; C09K005/10; C11D007/50A2; M11D; M11D; M11D; M11D
EP 1583815	IPCI	B08B0003-08 [I,C]; C09K0005-00 [I,C]; C11D0007-22 [N,C]; C11D0007-50 [I,C]; H05K0003-26 [I,C]; C11D0007-50 [I,A]; B08B0003-08 [I,A]; C09K0005-04 [I,A]; C11D0007-26 [N,A]; C11D0007-28 [N,A]; C11D0007-34 [N,A]; H05K0003-26 [I,A]
	IPCR	B08B0003-04 [I,C*]; B08B0003-04 [I,A]; B08B0003-08 [I,C*]; B08B0003-08 [I,A]; C09K0003-30 [I,C*];

C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-10 [I,A]; C11D0007-22 [N,C*]; C11D0007-26 [N,A]; C11D0007-28 [N,A]; C11D0007-34 [N,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]

	ECLA	B08B003/04; B08B003/08; C09K003/30; C09K005/10; C11D007/50A2
CN 1738894	IPCI	C11D0007-50 [I,A]; C09K0005-04 [I,A]; C09K0005-00 [I,C*]; B08B0003-08 [I,A]; H05K0003-26 [I,A]; C11D0007-34 [I,A]; C11D0007-28 [N,A]; C11D0007-26 [N,A]; C11D0007-22 [N,C*]
	IPCR	C11D0007-50 [I,A]; B08B0003-04 [I,C*]; B08B0003-04 [I,A]; B08B0003-08 [I,C*]; B08B0003-08 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-10 [I,A]; C11D0007-22 [N,C*]; C11D0007-26 [N,A]; C11D0007-28 [N,A]; C11D0007-34 [N,A]; C11D0007-50 [I,C]
	ECLA	B08B003/04; B08B003/08; C09K003/30; C09K005/10; C11D007/50A2
JP 2006516296	IPCI	C11D0007-50 [I,A]; C11D0007-30 [I,A]; C11D0007-26 [I,A]; C11D0007-34 [I,A]; C11D0007-22 [I,C*]; C09K0003-30 [I,A]; C09K0003-00 [I,A]; C09K0005-04 [I,A]; C09K0005-00 [I,C*]; B08B0003-08 [I,A]; D06L0001-02 [I,A]; D06L0001-00 [I,C*]
	IPCR	C11D0007-50 [I,A]; B08B0003-04 [I,C*]; B08B0003-04 [I,A]; B08B0003-08 [I,C]; B08B0003-08 [I,A]; C09K0003-00 [I,C]; C09K0003-00 [I,A]; C09K0003-30 [I,C]; C09K0003-30 [I,A]; C09K0005-00 [I,C]; C09K0005-04 [I,A]; C09K0005-10 [I,A]; C11D0007-22 [I,C]; C11D0007-26 [I,A]; C11D0007-28 [N,A]; C11D0007-30 [I,A]; C11D0007-34 [I,A]; C11D0007-50 [I,C]; D06L0001-00 [I,C]; D06L0001-02 [I,A]
	FTERM	3B201/AA46; 3B201/AB01; 3B201/BB02; 3B201/BB04; 3B201/BB12; 3B201/BB13; 3B201/BB14; 3B201/BB82; 3B201/BB85; 3B201/BB95; 3B201/CC01; 3B201/CC11; 3B201/CD32; 3B201/CD33; 4H003/DA05; 4H003/DA14; 4H003/DA15; 4H003/DC03; 4H003/ED26; 4H003/ED28; 4H003/ED29; 4H003/ED32; 4H003/FA45
AT 332357	IPCI	C11D0007-50 [ICS,7]; B08B0003-08 [ICS,7]; C09K0005-04 [ICS,7]; C09K0005-00 [ICS,7,C*]; C11D0007-26 [ICS,7]; C11D0007-28 [ICS,7]; C11D0007-34 [ICS,7]; C11D0007-22 [ICS,7,C*]; H05K0003-26 [ICS,7]
	IPCR	B08B0003-04 [I,C*]; B08B0003-08 [I,C*]; C09K0003-30 [I,C*]; C09K0005-00 [I,C*]; C11D0007-22 [N,C*]; C11D0007-50 [I,C*]; B08B0003-04 [I,A]; B08B0003-08 [I,A]; C09K0003-30 [I,A]; C09K0005-10 [I,A]; C11D0007-26 [N,A]; C11D0007-28 [N,A]; C11D0007-34 [N,A]; C11D0007-50 [I,A]
	ECLA	B08B003/04; B08B003/08; C09K003/30; C09K005/10; C11D007/50A2
ES 2268617	IPCI	C11D0007-50 [I,C]; C11D0007-50 [I,A]; B08B0003-08 [I,C]; B08B0003-08 [I,A]; C09K0005-00 [I,C]; C09K0005-04 [I,A]; C11D0007-22 [N,C]; C11D0007-26 [N,A]; C11D0007-28 [N,A]; C11D0007-34 [N,A]; H05K0003-26 [I,C]; H05K0003-26 [I,A]
	IPCR	C11D0007-50 [I,C]; C11D0007-50 [I,A]; B08B0003-04 [I,C*]; B08B0003-04 [I,A]; B08B0003-08 [I,C]; B08B0003-08 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C]; C09K0005-04 [I,A]; C09K0005-10 [I,A]; C11D0007-22 [N,C]; C11D0007-26 [N,A]; C11D0007-28 [N,A]; C11D0007-34 [N,A]; H05K0003-26 [I,C]; H05K0003-26 [I,A]
	ECLA	B08B003/04; B08B003/08; C09K003/30; C09K005/10;

C11D007/50A2; M11D; M11D; M11D; M11D
US 20060052268 IPCI C11D0017-00 [I,A]
IPCR C11D0017-00 [I,A]; B08B0003-04 [I,C*]; B08B0003-04 [I,A]; B08B0003-08 [I,C*]; B08B0003-08 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-10 [I,A]; C11D0007-22 [N,C*]; C11D0007-26 [N,A]; C11D0007-28 [N,A]; C11D0007-34 [N,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; C11D0017-00 [I,C]
NCL 510/411.000
ECLA B08B003/04; B08B003/08; C09K003/30; C09K005/10; C11D007/50A2

AB Environmentally friendly compns. for replacing HCFC 141b in cleaning, flux removal, degreasing, and drying of surfaces contain fluorohydrocarbons or fluorohydro ethers and >1 of diacetone alc., DMSO and sec-butanol.

ST cleaning solvent fluorohydrocarbon oxygenated solvent mixt surface; ether fluorohydro oxygenated solvent mixt cleaning solvent surface; dichlorofluoroethane replacement fluorohydrocarbon oxygenated solvent mixt; diacetone alc fluorohydrocarbon mixt cleaning solvent surface; secondary butanol fluorohydrocarbon mixt cleaning solvent surface; DMSO fluorohydrocarbon mixt cleaning solvent surface; drying solvent fluorohydrocarbon oxygenated solvent mixt surface; flux removing solvent fluorohydrocarbon oxygenated solvent mixt surface; degreasing solvent fluorohydrocarbon oxygenated solvent mixt surface

IT Blowing agents
(environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for blowing agents for polyurethanes)

IT Cleaning solvents
Degreasing agents
Drying agents
Refrigerating apparatus
(environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for cleaning and drying of surfaces)

IT Polyurethanes, uses
RL: POF (Polymer in formulation); USES (Uses)
(environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for cleaning and drying of surfaces)

IT Polysiloxanes, miscellaneous
RL: MSC (Miscellaneous)
(environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for deposition of silicones)

IT Heat transfer agents
(environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for heat-transfer agents)

IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoro; environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for cleaning and drying of surfaces)

IT Ethers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluorohydro; environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for cleaning and drying of surfaces)

IT Fluxes
(removal, agents; environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for cleaning and drying of surfaces)

IT Printed circuits

Textiles
(substrates; environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for cleaning and drying of surfaces)
IT 406-58-6, 1,1,1,3,3-Pentafluorobutane
RL: TEM (Technical or engineered material use); USES (Uses)
(HFC 365mfc; environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for cleaning and drying of surfaces)
IT 138495-42-8, 1,1,1,2,3,4,4,5,5,5-Decafluoropentane
RL: TEM (Technical or engineered material use); USES (Uses)
(HFC 4310mee; environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for cleaning and drying of surfaces)
IT 67-68-5, DMSO, uses 75-10-5, HFC 32 75-37-6, HFC 152a
76-19-7, HFC 218 78-92-2, sec-Butanol 123-42-2, Diacetone alcohol
353-36-6, HFC 161 354-33-6, HFC 125 355-79-3,
Perfluorotetrahydropyran 375-03-1, Heptafluoropropyl methyl ether
382-28-5, PF 5052 420-46-2, HFC 143a 431-89-0, HFC 227ea
460-73-1, HFC 245fa 811-97-2, HFC 134a 19430-93-4,
Perfluorobutylethylene 25291-17-2, Perfluorohexylethylene 133452-70-7,
Tridecafluorohexane 139064-00-9, Heptafluorocyclopentane 163702-05-4,
Nonafluorobutyl ethyl ether 163702-07-6, Nonafluorobutyl methyl ether
RL: TEM (Technical or engineered material use); USES (Uses)
(environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for cleaning and drying of surfaces)
IT 1717-00-6, HCFC 141b
RL: MSC (Miscellaneous)
(substitutes for; environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for cleaning and drying of surfaces)
IT 12597-68-1, Stainless steel, miscellaneous
RL: MSC (Miscellaneous)
(substrates; environmentally friendly compns. containing fluorohydrocarbons or fluorohydro ethers and oxygenated solvents for cleaning and drying of surfaces)
RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Atochem Elf; FR 2792649 A 2000 CAPLUS
(2) Atofina; FR 2800746 A 2001 CAPLUS
(3) DuPont; WO 0017301 A 2000 CAPLUS
(4) Honda; US 20010034313 A1 2001 CAPLUS
(5) Inada; US 5690750 A 1997 CAPLUS
(6) Machak; US 6482270 B1 2002 CAPLUS
(7) Wacker Chemie GMBH; DE 3325166 A 1985 CAPLUS
(8) Wojtczak; US 20020068685 A1 2002

L15 ANSWER 36 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2004:563806 CAPLUS
DN 141:227469
ED Entered STN: 15 Jul 2004
TI Influence of thermophysical properties on pool boiling heat transfer of refrigerants
AU Gorenflo, Dieter; Chandra, Untung; Kotthoff, Stephan; Luke, Andrea
CS Thermodynamik und Energietechnik, ThEt, Waerme- und Kaeltetechnik, Universitaet Paderborn, Paderborn, D-33098, Germany
SO International Journal of Refrigeration (2004), 27(5), 492-502
CODEN: IJRFDI; ISSN: 0140-7007
PB Elsevier Science Ltd.
DT Journal
LA English

CC   48-5 (Unit Operations and Processes)

AB   The correct prediction of the heat transfer performance of the boiling liquid within the evaporator of a refrigeration unit is one of the essential features for the successful operation of the whole unit. A theor. consistent calcn. method for the heat transfer coefficient, α, in nucleate boiling, which should be based on the phys. phenomena connected with vapor bubbles growing, departing and sliding on the wall and with the interactions of bubbles and of neighboring nucleation sites within the microstructure of the heating surface, does not yet exist, despite the increasing number of papers on the subject in the recent past. Instead, the predictive methods for α available at present are empirical or semiempirical, especially for heat transfer conditions relevant in practice. Many of these correlations were established in the form of power laws in which the relative effects of the main groups of variables on α are treated by sep. factors. One of these may stand for the effect of the thermophys. properties of the boiling liquid or these properties are included in several of the factors. New exptl. results are presented for pool boiling heat transfer from a single horizontal copper tube (8 mm diameter) to HFC-refrigerants (R32, R125, R134a, R143a, R152a, R227ea) and hydrocarbons (propane, i-butane). The results are compared to exptl. data from the literature, and methods are discussed, how to incorporate the data in semiempirical correlations to describe the effect of the thermophys. properties of the fluids on the heat transfer performance.

ST   pool boiling heat transfer refrigerant thermophys property effect

IT   Heat transfer
     Refrigerants
        (anal. of effect of thermophys. properties on pool boiling heat transfer of refrigerants)

IT   Boiling
        (pool; anal. of effect of thermophys. properties on pool boiling heat transfer of refrigerants)

IT   74-98-6, Propane, processes 75-10-5, R32, Refrigerant   75-28-5
     75-37-6, R152a 354-33-6, R125 420-46-2, R143a
     431-89-0, R227Ea 811-97-2, R134a
     RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
        (anal. of effect of thermophys. properties on pool boiling heat transfer of refrigerants)

RE.CNT 19   THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Bier, K; Bull Inst Int Froid 1973-1974, P135 CAPLUS
(2) Bier, K; Chemie-Ingenieur-Technik 1973, V14, P935
(3) Bier, K; Heat Transfer in Boiling 1977, P137 CAPLUS
(4) Bier, K; Int J Refrig 1990, V13, P293 CAPLUS
(5) Borishanskij, V; Proceedings of the International Heat Transfer Conference Boulder (USA) and Westminster (UK) 1961-1962, P475
(6) Cooper, M; Advances in Heat Transfer V16, P157 CAPLUS
(7) Gorenflo, D; Proceedings of the 11th International Heat Transfer Conference Kyongju (Korea) 1998, V1, P149
(8) Gorenflo, D; Proceedings of the 17th International Congress on Refrigeration 1987, VB, P955
(9) Gorenflo, D; Proceedings of the 3rd European Thermal Sciences Conference 2000, V2, P743
(10) Gorenflo, D; VDI-Warmeatlas, Behaltersieden (Pool Boiling) 2002
(11) Gorenflo, D; Warme- und Stoffubertragung 1982, V16, P69 CAPLUS
(12) Gorenflo, D; Warme- und Stoffubertragung 1991, V26, P273 CAPLUS
(13) Jung, D; Int J Refrig 2003, V26, P240 CAPLUS
(14) Leiner, W; Int J Heat Mass Transfer 1994, V37(5), P763 CAPLUS
(15) Luke, A; Diss Universitat Paderborn 1996
(16) Luke, A; Multiphase Sci Technol 2001, V12(2), P1
(17) Nishikawa, K; Proceedings of the 7th International Heat Transfer Conference Munchen (Germany) 1982, V4, P1

(18) Stephan, K; Abhandlungen des Deutschen Kaltetechn Vereins 1964, 18
(19) Stephan, K; Int J Heat Mass Transfer 1980, V23, P73 CAPLUS

L15 ANSWER 37 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2004:402270 CAPLUS
DN 140:377726
ED Entered STN: 18 May 2004
TI Naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants
IN Cohen, Stephen C.; Costello, Michael
PA Crompton Corporation, USA
SO U.S., 5 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM C10M105-18
ICS C09K005-04
INCL 252068000
CC 51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6736991	B1	20040518	US 2003-365750	20030212
	WO 2004072215	A1	20040826	WO 2004-US1910	20040121

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI
RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRAI US 2003-365750 A 20030212
CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 6736991	ICM	C10M105-18
	ICS	C09K005-04
	INCL	252068000
	IPCI	C10M0105-18 [ICM,7]; C10M0105-00 [ICM,7,C*]; C09K0005-04 [ICS,7]; C09K0005-00 [ICS,7,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]
	NCL	252/068.000
	ECLA	C09K005/04B4B; C10M171/00R
WO 2004072215	IPCI	C10M0171-00 [ICM,7]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]
	ECLA	C09K005/04B4B; C10M171/00R; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10N; M10N; M10N

AB Clear and transparent refrigerator lubricating oil compns. that are immiscible with a hydrofluorocarbon refrigerant consists of a naphthenic base oil (sulfur and nitrogen contents ≤0.05 weight%, viscosity 13-100 cSt at 40°) and 5-30 weight parts (per 100 weight parts base oil) of a nonionic surfactant, with hydrophilic-lipophilic balance 9.8-11.8. Suitable surfactants are selected from ethoxylated sorbitan derivs., ethoxylated alcs., ethoxylated alkylaryl phenols, ethoxylated fatty acids, and ethoxylated fatty esters. The composition has a pour point ≤-20° and is immiscible with the refrigerant over the entire temperature range of -40° to 80°. The compns. are suitable for use with such refrigerants as 1,1,1,2-tetrafluoroethane, 1,1,1-trifluoroethane, 1,1-difluoroethane, difluoromethane, and

pentafluoroethane.
ST compressor refrigeration lubricating oil immiscible refrigerant; hydrofluorocarbon refrigerant immiscible naphthenic lubricating oil; nonionic surfactant naphthenic refrigeration lubricating oil
IT Phenols, uses
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(alkyl, ethoxylated, nonionic surfactants; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
IT Lubricating oils
(base oils, synthetic; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
IT Naphthenic oils
RL: TEM (Technical or engineered material use); USES (Uses)
(base oils; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
IT Alcohols, uses
Fatty acids, uses
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(branched, nonionic surfactants; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
IT Lubricating oils
(compressor; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
IT Fatty acids, uses
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(esters, ethoxylated, nonionic surfactants; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
IT Alcohols, uses
Fatty acids, uses
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(ethoxylated, nonionic surfactants; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoro, refrigerants; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
IT Refrigerants
(hydrofluorocarbon; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
IT Surfactants
(nonionic; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
IT Fatty acids, uses
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(unsatd., nonionic surfactants; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
IT 71-43-2D, Benzene, alkyl derivs.
RL: TEM (Technical or engineered material use); USES (Uses)
(base oils; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
IT 53694-15-8, Sorbitan
RL: NUU (Other use, unclassified); TEM (Technical or engineered material

use); USES (Uses)
(nonionic surfactant; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
IT 75-10-5, Difluoromethane 75-37-6, 1,1-Difluoroethane
354-33-6, Pentafluoroethane 420-46-2,
1,1,1-Trifluoroethane 811-97-2, 1,1,1,2-Tetrafluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerant; naphthenic oil-based refrigeration lubricating oils immiscible with hydrofluorocarbon refrigerants)
RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

(1) Anon; EP 0908509 A1 1999 CAPLUS
(2) Brown; US 5152926 A 1992 CAPLUS
(3) Gopalnarayanan; 8th International Refr Conf Purdue 2000, P233
(4) Kaneko; US 6193906 B1 2001 CAPLUS
(5) Kawaguchi; US 6475405 B1 2002 CAPLUS
(6) O'Neill; US 5298178 A 1994 CAPLUS
(7) Reyes-Gavilan; US 5792383 A 1998 CAPLUS
(8) Sundaresan; Proc Int Refrig Conf Purdue 6th 1996, P297 CAPLUS
(9) Sundaresan; Proc Int Refrig Conf Purdue, 6th 1996, P187 CAPLUS
(10) Yamamoto; Tribology Transactions 2001, V44, P209 CAPLUS

L15 ANSWER 38 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2004:257129 CAPLUS
DN 140:323374
ED Entered STN: 29 Mar 2004
TI Study on thermodynamic properties of HFCs refrigerant mixtures
AU Wu, Xianzhong; Li, Meiling; Kong, Yi
CS Shanghai Refrigerating Machine Works, Shanghai, 200070, Peop. Rep. China
SO Zhileng Xuebao (2003), 24(2), 16-21
CODEN: CLHPDE; ISSN: 0253-4339
PB Xueshu Qikan Chubanshe
DT Journal
LA Chinese
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 69
AB To calculate thermodn. properties of ternary refrigerant mixts., the binary interaction parameters of the nonrandom two liquid (NRTL) excess Gibbs free-energy model for ten groups of HFC (hydrofluorocarbon) refrigerant mixts. were correlated by the vapor liquid equilibrium exptl. data with the Peng-Robinson (PR) equation of state and the Huron-Vidal original mixture rules. At the same time, the vapor-liquid equilibrium of ternary refrigerant mixts. of R32/R125/R134a and R125/R143a/R134a was predicted with determined interaction parameters. Calculated results showed a good agreement with the exptl. data, especially the average deviations of bubble point pressure were < 0.42%. At last, the characteristics of the refrigeration cycle with R32/R125 and R407c were analyzed and discussed.
ST hydrofluorocarbon refrigerant thermodn property
IT Bubble point
Free energy
Peng-Robinson equation of state
Refrigerants
Thermodynamics
(thermodn. properties of ternary hydrofluorocarbon refrigerant mixts.)
IT 75-10-5, R32 354-33-6, R125 420-46-2, R143a
811-97-2, R134a 158675-78-6, R407c
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(thermodn. properties of ternary hydrofluorocarbon refrigerant mixts.)

L15 ANSWER 39 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2004:211664 CAPLUS

DN 140:425424
ED Entered STN: 17 Mar 2004
TI Thermodynamic analyses of refrigerant mixtures using artificial neural networks
AU Arcaklioglu, Erol; Cavusoglu, Abdullah; Erisen, Ali
CS Kirikkale University Engineering Faculty, Yahsihan, 71450, Turk.
SO Applied Energy (2004), 78(2), 219-230
CODEN: APENDX; ISSN: 0306-2619
PB Elsevier Science B.V.
DT Journal
LA English
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 69
AB The aim of this study is to make a contribution towards the efforts of reducing the use of CFCs by finding a drop-in replacement for pure refrigerants used in domestic and industrial appliances. The suggested solution is the use of HFC and HC based refrigerant mixts. In this study, different possible ratios are studied of these mixts. and their corresponding performances by using artificial neural networks (ANNs). This dramatically reduces the times and efforts required to achieve these targets. Coeffs. of performances (COPs) and total irreversibilities (TIs) of refrigerants and their mixts. were calculated for a vapor-compression refrigeration system with a liquid/suction line heat exchanger. The constant cooling-load method is taken as a reference The thermodn. properties of
refrigerants were taken from REFPROP 6.01. To train the network, based on scaled conjugate gradient (SCG), Pola-Ribiere conjugate gradient (CGP), and Levenberg-Marquardt (LM) learning algorithms, and a logistic sigmoid transfer function, various ratios are used of 7 refrigerant mixts. of HFCs and HCs along with three CFCs (R12, R22, and R502). They were used as inputs while the COP and total irreversibility values, calculated as above, were the outputs. The network has yielded R2 values of 0.9999 and maximum errors for training and test data were 2 and 3%, resp.
ST refrigerant mixt artificial neural network thermodn analysis
IT Simulation and Modeling
(neural network; thermodn. analyses of refrigerant mixts. by using artificial neural networks)
IT Refrigerants
Thermodynamics
(thermodn. analyses of refrigerant mixts. by using artificial neural networks)
IT 74-98-6, R290, properties 75-10-5, R32 75-28-5, R600a
75-37-6, R152a 75-45-6 75-71-8, R12, Refrigerant 354-33-6,
R125 420-46-2, R143a 811-97-2, R134a 39432-81-0,
R502
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(thermodn. analyses of refrigerant mixts. by using artificial neural networks)
RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

(1) Anon; Matlab Version 6.0 Online Manual
(2) Arcakhoglu, E; Energy conversion and management Submitted
(3) Arcakhoglu, E; International Journal of Energy Research in press
(4) Bechtler, H; Applied Thermal Engineering 2001, V21, P941
(5) Camporese, R; International Journal of Refrigeration 1997, V20, P22 CAPLUS
(6) Didion, D; International Journal of Refrigeration 1990, V13, P163 CAPLUS
(7) Gunther, D; International Journal of Refrigeration 1997, V20, P235 CAPLUS
(8) Jung, D; International Journal of Refrigeration 1991, V14, P223 CAPLUS
(9) Kalogirou, S; Applied Energy 2000, V67, P17
(10) Kalogirou, S; Energy 2000, V25, P479
(11) Massie, D; ECOS'01 2001, P123

(12) McMullan, J; International Journal of Refrigeration 2002, V25, P89 CAPLUS
(13) Olofsson, T; Energy and Buildings 2001, V33, P85
(14) Pacheco-Vega, A; International Journal of Heat Mass and Transfer 2001, V44, P763
(15) Palau, A; International Journal of Refrigeration 1999, V22, P59 CAPLUS
(16) Richardson, R; International Journal of Refrigeration 1995, V18, P58 CAPLUS
(17) Sharma, R; Computers and Chemical Engineering 1999, V23, P385 CAPLUS
(18) Sozen, A; Applied Thermal Engineering 2003, V23, P937 CAPLUS

L15 ANSWER 40 OF 175 CAPLUS
AN 2004:110090 CAPLUS
DN 140:130317
ED Entered STN: 11 Feb 2004
TI Surface tension measurements of binary hydrofluorocarbon mixtures
AU Lin, Hong; Duan, Yuanyuan
CS Department of Thermal Engineering, Tsinghua University, Beijing, 100084, Peop. Rep. China
SO Qinghua Daxue Xuebao, Ziran Kexueban (2003), 43(12), 1672-1675
CODEN: QDXKE8; ISSN: 1000-0054
PB Qinghua Daxue Chubanshe
DT Journal
LA Chinese
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 68
AB Surface tension data for hydrofluorocarbon (HFC) mixts., which are interim and long-term alternatives to fluorocarbons, is necessary for proper design of air conditioners and refrigeration equipment. The surface tensions of HFC-32/125, HFC-32/134a, HFC-32/227ea, HFC-143a/227ea, and HFC-143a/134a were measured from 253-333 K by using the differential capillary rise method (DCRM) for vapor-liquid equilibrium conditions. The temperature and surface tension uncertainties were estimated to be within ± 10 mK and ± 0.15 mN · m-1. The exptl. data and correlations for the corresponding pure refrigerants were used to develop a van der Waals-type correlation to represent the surface tension of the five binary mixts. The exptl. results and correlation compare well with available data in the literature.
ST binary hydrofluorocarbon mixt surface tension measurement; air conditioner refrigerator hydrofluorocarbon mixt surface tension measurement; vapor liq equil hydrofluorocarbon mixt refrigerant
IT Mixtures
(binary; measurement of surface tension of binary hydrofluorocarbon refrigerant mixts.)
IT Hydrocarbons, properties
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(fluoro; measurement of surface tension of binary hydrofluorocarbon refrigerant mixts.)
IT Air conditioners
Refrigerants
Refrigerating apparatus
Surface tension
Vapor-liquid equilibrium
(measurement of surface tension of binary hydrofluorocarbon refrigerant mixts.)
IT 75-10-5, HFC-32 354-33-6, HFC-125 420-46-2, HFC-143a 431-89-0, HFC-227ea 811-97-2, HFC-134a
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(measurement of surface tension of binary hydrofluorocarbon refrigerant mixts.)

L15 ANSWER 41 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2003:517987 CAPLUS
DN 140:146950
ED Entered STN: 08 Jul 2003
TI Modeling the solubility of blowing agents in polyols
AU Visco, Donald P.; Parthasarathy, Ranganathan
CS Department of Chemical Engineering, Tennessee Technological University, Cookeville, TN, 38505, USA
SO Annual Meeting Archive - American Institute of Chemical Engineers, Indianapolis, IN, United States, Nov. 3-8, 2002 (2002), 282-288 Publisher: American Institute of Chemical Engineers, New York, N. Y.
CODEN: 69DXW7
DT Conference; (computer optical disk)
LA English
CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 65
AB The solubility of a blowing agent in a polyol plays a crucial role in the formation of a useful foam since too little dissolved blowing agent could form an uneven foam. The proper blowing agent/polyol combinations used in the manufacture of PUR foams has not been optimized for particular applications and experience is normally used as the main guide. Accordingly, a more detailed, systematic approach to this problem of polyol-blowing agent selection is desired. Environmental protection agencies have been enforcing various protocols on the usage of blowing agents to prevent lessening the ozone layer, smog formation and global warming. Therefore, chlorofluorocarbons (CFC) and hydrochlorofluorocarbons (HCFC) are in various stages of phase out due to their high ozone depletion potential. Stringent limitations forced the industrial sectors to search for new suitable blowing agent alternatives for all applications. This work focuses on exploring the various combinations of polyols and HFC blowing agents in order to predict the suitable combinations (absorption levels) from a thermodn. model. The model used in this work to perform the task is the Sanchez-Lacombe equation of state. The model has been chosen because, in the past, it has been useful in modeling the solubility of small mols. in polymers. The results from this study are reported on various HFC blowing agents: R134a, R245fa, R365mfc, R245ca, R32, R152a, R 43a, R125 and on various polyols: Pluracol 355, Terol 352, Pluracol 975, and Stepanpol PS 3152. It is found that the third generation blowing agents like R 245fa, R 245ca, R 365mfc demonstrated more absorption in the polyols tested even at very low pressures and temps. Hence, durable PUR foams can be prepared using these combinations for suitable applications.
ST foam blowing agent polyol soly modeling Sanchez equation state
IT Equation of state
(Sanchez-Lacombe; in modeling the solubility of blowing agents in polyols)
IT Hydrocarbons, properties
RL: PRP (Properties)
(chlorofluorocarbons; modeling the solubility of blowing agents in polyols)
IT Blowing agents
Solubility
(modeling the solubility of blowing agents in polyols)
IT Absorption
(of blowing agents in polyols)
IT Alcohols, properties
RL: PRP (Properties)
(polyhydric; modeling the solubility of blowing agents in polyols)
IT Plastic foams
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(polyurethanes; modeling the solubility of blowing agents in polyols for PU foam)
IT 75-10-5, HFC 32 75-37-6, HFC 152a 354-33-6, HFC 125

406-58-6, HFC 365mfc 420-46-2, HFC 143a   460-73-1, HFC 245fa
679-86-7, HFC 245ca 811-97-2, HFC 134a
RL: PRP (Properties)
(blowing agents; modeling the solubility of blowing agents in polyols)
IT   51178-86-0, Pluracol 355   89287-08-1, Stepanpol PS3152   101551-03-5,
Pluracol 975   255838-19-8, Terol 352
RL: PRP (Properties)
(modeling the solubility of blowing agents in polyols)
RE.CNT 15   THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; www.basf.com/usa
(2) Anon; www.oxid.net
(3) Anon; www.stepan.com
(4) Bogdan, M; Polyurethane expo 2001
(5) Decaire, B; J Cell Plast 1994, V30, P1
(6) Di Nicola, G; J Chem Eng Data 2001, V46, P1619 CAPLUS
(7) Di Nicola, G; J Chem Eng Data 2002, V47, P882 CAPLUS
(8) Hariharan, R; J Polym Sci 1993, V50, P1781 CAPLUS
(9) Marrucho, I; J Chem Eng Data 2002, V47, P554 CAPLUS
(10) Musso, E; J Fluo chem 1996, V78, P167 CAPLUS
(11) Perry, R; Perry's Chemical engineers' Handbook 7th ed 1997
(12) Sanchez, I; Macromolecules 1978, V11(6), P1145 CAPLUS
(13) Sato, Y; Polym eng and Sci 2000, V40(6), P1369 CAPLUS
(14) Schmidt, J; Fluid Phase Equib 1996, V122, P187 CAPLUS
(15) Zipfel, L; Polyurethane Expo 2001

L15 ANSWER 42 OF 175 CAPLUS
AN   2003:514775 CAPLUS
DN   139:236133
ED   Entered STN: 07 Jul 2003
TI   Use of artificial neural networks for calculating derived thermodynamic quantities from volumetric property data
AU   Laugier, S.; Richon, D.
CS   Ecole Nationale Superieure de Chimie et Physique de Bordeaux, Pessac, 33607, Fr.
SO   Fluid Phase Equilibria (2003), 210(2), 247-255
CODEN: FPEQDT; ISSN: 0378-3812
PB   Elsevier Science B.V.
DT   Journal
LA   English
CC   69-2 (Thermodynamics, Thermochemistry, and Thermal Properties)
Section cross-reference(s): 48, 65, 68
AB   Thermodn. and transport property data on environmentally acceptable refrigerant fluids are of the utmost interest for the refrigeration industry and, in particular, for designing and optimizing refrigeration equipment: heat exchangers and compressors. Up to now, the simultaneous representation of vapor-liquid equilibrium (VLE) and pressure-volume-temperature (PVT) data is not satisfactory enough with respect to exptl. accuracies. New models are then highly required. Therefore, an effort has been made to develop an alternative to a classical equation of state. This work deals with the potential application of artificial neural networks to represent PVT data within their exptl. uncertainty. The second aim of the work is to obtain, by numerical derivs., other properties such as enthalpies, entropies, heat capacities, expansion coeffs., speed of sounds, etc. Tests presented here were performed on data corresponding to six refrigerants from 240 to 340 K at pressures up to 20 MPa.
ST   refrigerant thermodn simulation artificial neural network
IT   Thermodynamic simulation
(artificial neural networks for calculating derived thermodn. quantities from volumetric property data)

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IT   Enthalpy
     Heat capacity
     Refrigerants
     Vapor-liquid equilibrium
        (artificial neural networks for refrigerant thermodn.)
IT   Simulation and Modeling
        (neural network; artificial neural networks for calculating derived
        thermodn. quantities from volumetric property data)
IT   Sound and Ultrasound
        (velocity; artificial neural networks for refrigerant thermodn.)
IT   74-98-6, R290, properties 75-10-5, R32 354-33-6, R125
     420-46-2, R143a   431-89-0, R227Ea 811-97-2, R134a
     RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP
     (Physical process); PROC (Process)
        (artificial neural networks for refrigerant thermodn.)
RE.CNT  8     THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
```


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(1) Chouai, A; Fluid Phase Equilib 2002, V199, P53 CAPLUS
(2) Daubert, T; Physical and Thermodynamic Properties of Pure Chemicals, Data
    Compilation 1998
(3) Dymond, J; Fluid Phase Equilib 2002, V199, P1 CAPLUS
(4) Laugier, S; Proceedings of the Seventh Congress of the Asian Pacific
    Confederation of Chemical Engineers 1996, V3, P1039
(5) Mc Linden, M; Int J Thermophys 1989, V10, P563
(6) Tillner-Roth, R; J Phys Chem Ref Data 1994, V23, P657 CAPLUS
(7) Tillner-Roth, R; J Phys Chem Ref Data 1997, V26, P1273 CAPLUS
(8) Watanabe, K; Fluid Phase Equilib 1992, V80, P1 CAPLUS
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L15  ANSWER 43 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2003:274812  CAPLUS
DN   138:288733
ED   Entered STN:  09 Apr 2003
TI   Polyphenylene sulfides moldings with suppressed oligomer elution,
     compressors having them, and cooling air conditioners using them
IN   Matsumoto, Michiyoshi; Hanaki, Takayuki; Ogasawara, Shinobu; Matsunaga,
     Kuniaki; Iwata, Shuichi; Tajima, Mobuyoshi
PA   Toray Industries, Inc., Japan; Mitsubishi Electric Corp.
SO   Jpn. Kokai Tokkyo Koho, 9 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C08J005-00
     ICS  C08G075-02; C08K005-20; C08L081-02
CC   38-3 (Plastics Fabrication and Uses)
     Section cross-reference(s): 47
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.       DATE
     ---------------     ----   --------   --------------------   --------
PI   JP 2003105099        A     20030409   JP 2001-301953         20010928
PRAI JP 2001-301953             20010928
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 JP 2003105099   ICM    C08J005-00
                 ICS    C08G075-02; C08K005-20; C08L081-02
                 IPCI   C08J0005-00 [ICM,7]; C08G0075-02 [ICS,7]; C08G0075-00
                        [ICS,7,C*]; C08K0005-20 [ICS,7]; C08K0005-00
                        [ICS,7,C*]; C08L0081-02 [ICS,7]; C08L0081-00 [ICS,7,C*]
                 IPCR   C08J0005-00 [I,C*]; C08J0005-00 [I,A]; C08G0075-00
                        [I,C*]; C08G0075-02 [I,A]; C08K0005-00 [I,C*];
                        C08K0005-20 [I,A]; C08L0081-00 [I,C*]; C08L0081-02
                        [I,A]
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AB   The moldings, useful for refrigerating systems, comprise
     polyphenylene sulfide compns. with oligomer extraction (Soxhlet extraction,
with
     $CHCl_3$ for 5 h) ≤0.4% containing fatty acid amides. Thus,
     1,4-dichlorobenzene-sodium sulfide copolymer, glass fibers (JA 523),
     sebacic acid-ethylenediamine-stearic acid condensates, and a silane compound
     were kneaded and injection-molded to give a test piece showing oligomer
     extraction 0.16%, good mold releasability, and no precipitation in mixing with
     refrigerants at least down to −40°.

ST   polyphenylene sulfide fatty amide molding compressor; air conditioner
     refrigerator PPS elution prevention; dichlorobenzene sodium
     sulfide polymer compressor mold releasability

IT   Glass fibers, uses
     RL: MOA (Modifier or additive use); TEM (Technical or engineered material
     use); USES (Uses)
        (JA 523; polyphenylene sulfide moldings with suppressed oligomer
        elution for compressors of cooling apparatus)

IT   Cooling apparatus
        (air conditioning; polyphenylene sulfide moldings with suppressed
        oligomer elution for compressors of cooling apparatus)

IT   Air conditioners
        (cooling apparatus; polyphenylene sulfide moldings with suppressed oligomer
        elution for compressors of cooling apparatus)

IT   Reinforced plastics
     RL: TEM (Technical or engineered material use); USES (Uses)
        (glass fiber-reinforced; polyphenylene sulfide moldings with suppressed
        oligomer elution for compressors of cooling apparatus)

IT   Polyamides, uses
     RL: MOA (Modifier or additive use); TEM (Technical or engineered material
     use); USES (Uses)
        (mold releasing agent; polyphenylene sulfide moldings with suppressed
        oligomer elution for compressors of cooling apparatus)

IT   Parting materials
        (mold-release agents; polyphenylene sulfide moldings with suppressed
        oligomer elution for compressors of cooling apparatus)

IT   Esters, uses
     Ethers, uses
     Glycols, uses
     Naphthenic oils
     Paraffin oils
     Polyolefins
     RL: TEM (Technical or engineered material use); USES (Uses)
        (oils, refrigerant containing; polyphenylene sulfide moldings with
        suppressed oligomer elution for compressors of cooling apparatus)

IT   Compressors
     Refrigerants
        (polyphenylene sulfide moldings with suppressed oligomer elution for
        compressors of cooling apparatus)

IT   Polythiophenylenes
     RL: IMF (Industrial manufacture); TEM (Technical or engineered material
     use); PREP (Preparation); USES (Uses)
        (polyphenylene sulfide moldings with suppressed oligomer elution for
        compressors of cooling apparatus)

IT   Molded plastics, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (polyphenylene sulfide moldings with suppressed oligomer elution for
        compressors of cooling apparatus)

IT   57-11-4D, Stearic acid, reaction products with ethylenediamine and sebacic
     acid   24682-74-4, Ethylenediamine, stearate   30585-15-0D,
     Ethylenediamine-sebacic acid copolymer, reaction products with stearic
     acid   32126-82-2D, reaction products with stearic acid
     RL: MOA (Modifier or additive use); TEM (Technical or engineered material

use); USES (Uses)
(mold releasing agent; polyphenylene sulfide moldings with suppressed oligomer elution for compressors of cooling apparatus)

IT 71-43-2D, Benzene, alkyl derivs.
RL: TEM (Technical or engineered material use); USES (Uses)
(oils, refrigerant containing; polyphenylene sulfide moldings with suppressed oligomer elution for compressors of cooling apparatus)

IT 25212-74-2P, Poly(thio-1,4-phenylene) 26125-40-6P, 1,4-Dichlorobenzene-sodium sulfide copolymer
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyphenylene sulfide moldings with suppressed oligomer elution for compressors of cooling apparatus)

IT 74-98-6, Propane, uses 75-10-5, Difluoromethane 75-45-6, Chlorodifluoromethane 106-97-8, Butane, uses 115-10-6, Dimethyl ether 124-38-9, Carbon dioxide, uses 354-33-6, Pentafluoroethane 420-46-2, 1,1,1-Trifluoroethane 811-97-2, 1,1,1,2-Tetrafluoroethane 7664-41-7, Ammonia, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerant; polyphenylene sulfide moldings with suppressed oligomer elution for compressors of cooling apparatus)

L15 ANSWER 44 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2003:51834 CAPLUS
DN 138:172511
ED Entered STN: 22 Jan 2003
TI Pool boiling heat transfer & phase equilibrium: equimolar binary R125/134a compared with ternary R407C
AU Koester, Ralf; Kotthoff, Stephan; Gorenflo, Dieter
CS Benteler Automobiltechnik Gmbh & Co. KG, Paderborn, Germany
SO Thermophysical Properties and Transfer Processes of New Refrigerants, Conference of the International Institute of Refrigeration Commission B1, Paderborn, Germany, Oct. 3-5, 2001 (2001), 344-353. Editor(s): Gorenflo, Dieter; Luke, Andrea. Publisher: International Institute of Refrigeration, Paris, Fr.
CODEN: 69DMCM; ISBN: 2-913149-19-7
DT Conference; (computer optical disk)
LA English
CC 48-5 (Unit Operations and Processes)
AB Within the range of partly fluorinated hydrocarbons (HFC's), binary mixts. out of the components R32 (CH2F2), R125 (CHF2.CF3), R134a (CH2F.CF3) and R143a (CH3F.CF3) being preferred for com. refrigeration, vapor liquid equilibrium (VLE) and pool boiling heat transfer have been investigated for the three ternary systems that can be composed of the four components. The VLE data measured at temps. between 245 K and 315 K were correlated by cubic equations of state (CEOS) of the Trebble-Bishnoi-Salim type and modified Hankinson-Brobst-Thomson liquid d. correlations. The differences between calculated and measured values for the liquid d. are less than ±0.1% and for the pressure less than ±50 mbar, both mainly reflecting the exptl. error of the liquid composition measurements of ±0.5 mol %; for the vapor densities the differences lie within some percent (<3%). Heat transfer with pool boiling of binary or ternary mixts. of these systems is not or not much reduced below the values for the pure components, if heat flux and saturation pressure are low, as is the case in refrigeration applications, and the results are comparatively well represented by some of the existing heat transfer correlations for mixture boiling. A detailed comparison of the heat transfer coeffs. for the equimolar binary R125/R134a with ternary R407C reveals that the small differences between the results for the two mixts. can be explained by equilibrium properties in the case of beginning nucleation, and by mass transfer properties at high heat fluxes.
ST heat transfer pool boiling refrigerant mixt; phase equil boiling heat

transfer refrigerant
IT Boiling
Heat transfer
Refrigerants
Vapor-liquid equilibrium
(pool boiling heat transfer and phase equilibrium of refrigerant mixture)
IT 158675-78-6, R407C
RL: PRP (Properties)
(pool boiling heat transfer and phase equilibrium of refrigerant mixture)
IT 75-10-5, R32 354-33-6, R125 420-46-2, R143a
811-97-2, R134a
RL: PRP (Properties)
(pool boiling heat transfer and phase equilibrium of refrigerant mixture containing)
RE.CNT 27 THERE ARE 27 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Baehr, H; Heat and Mass Transfer 1998
(2) Bier, K; Fortschritts-Berichte VDI 1994, 19, Nr 79
(3) Bier, K; Proc 6th Int Heat Transfer Conf 1978, V1, P151 CAPLUS
(4) Fujita, Y; Int Journal of Heat and Mass Transfer 1994, V37, P291 CAPLUS
(5) Fujita, Y; JSME Int Journal Series B 1997, V40, P134
(6) Gorenflo, D; Int Jour Refrig 2001, V24, P6 CAPLUS
(7) Gorenflo, D; Proc of The ASME-ZSITS Int Therm Science Sem Bled 2000, V2, P25 CAPLUS
(8) Gorenflo, D; VDI Heat Atlas 1993
(9) Gorenflo, D; VDI Warmeatlas 8. Auflage 1997
(10) Gorenflo, D; Warme- und Stoffubertragung 1982, V16, P69 CAPLUS
(11) Gremer, F; Diss, Universitat Paderborn 2001
(12) Hankinson, R; AIChE Journal 1979, V25, P653 CAPLUS
(13) Hubner, P; Experimental Heat Transfer Fluid Mechanics and Thermodynamics 1997, V2, P633
(14) Koster, R; DKV-Tagungsbericht 26 1999, VII.1, P1
(15) Koster, R; Diss, Universitat Paderborn 2001
(16) Koster, R; High Temperatures -- High Pressures 1997, V29, P25 CAPLUS
(17) Luke, A; Diss, Universitat (GH) Paderborn 1996
(18) Nagel, M; Int J Ref Vol 1995, V18, P534 CAPLUS
(19) Palen, J; Hydrocarb Proc 1964, V43, P199 CAPLUS
(20) Piao, C; J Phys Chem Ref Data 1998, V27(4), P775 CAPLUS
(21) Salim, P; Fluid Phase Equil 1991, V65, P59 CAPLUS
(22) Schlunder, E; VT Verfahrenstechnik 1982, V16, P692
(23) Sherwood, T; Mass Transfer 1975
(24) Thome, J; AIChE Symposium Series 1981, V77, P238 CAPLUS
(25) Thome, J; AIChE Symposium Series 1987, V83, P46 CAPLUS
(26) Thomson, G; AIChE Journal 1982, V28, P671 CAPLUS
(27) Trebble, M; Fluid Phase Equil 1987, V35, P1 CAPLUS

L15 ANSWER 45 OF 175 CAPLUS
AN 2002:665134 CAPLUS
DN 137:386501
ED Entered STN: 04 Sep 2002
TI Evaluating wet compression in refrigeration cycles working with pure or non-azeotropic refrigerant mixtures for air-conditioners
AU Swanepoel, Wayne; Meyer, J. P.
CS Research Group for Cooling and Heating Technology, Department of Mechanical and Manufacturing Engineering, Rand Afrikaans University, S. Afr.
SO Proceedings of Symposium on Energy Engineering in the 21st Century, Hong-Kong, China, Jan. 9-13, 2000 (2000), Volume 3, 1105-1113. Editor(s): Cheng, Ping. Publisher: Begell House, Inc., New York, N. Y. CODEN: 69DAS2
DT Conference
LA English

CC   48-5 (Unit Operations and Processes)

AB   Wet compression vs. dry compression in refrigeration cycles working with pure refrigerants or non-azeotropic mixts. is investigated. In total 34 pure refrigerants as well as 31 non-azeotropic binary mixts. are considered. This resulted in approx. 300 different mixts. being analyzed. The pure refrigerants and refrigerant mixts. were analyzed for one cooling application, namely that of spatial air conditioning at an evaporating temperature of 7°C, and a condensing temperature of 50°C. The investigation was conducted with cycle analyses calculating performances at different wet and dry compressor inlet values. Use was made of thermodn. refrigerant properties calculated from a computer database. It was concluded that for both pure and non-azeotropic refrigerants analyzed, all those with re-entrant saturation vapor lines produce, better cooling COP's when the refrigerant is superheated before entering the compressor. Only a few of the refrigerants with bell-shaped T-s curves consistently produce higher cooling COP's when wet compression is used. However, their cooling capacities decreased while the compressor displacement rates increased. It was concluded that in general dry compression is more favorable than wet compression. From the exceptions that do exist, some manage to produce relatively high COPc's while retaining competitive cooling capacities. A byproduct of this study is that, from the vast amount of refrigerant mixts. analyzed, valuable knowledge was gathered regarding refrigerants not commonly used in the applications considered.

ST   compression refrigeration cycle refrigerant air conditioning

IT   Air conditioning
     Compression
     Refrigerants
       Refrigeration
        (evaluation of wet compression in refrigeration cycles working with pure or non-azeotropic refrigerant mixts. for air-conditioners)

IT   75-10-5, R32   75-37-6, R152a   75-45-6, R22   75-68-3, R142b
     75-69-4, R11   75-71-8, R12   76-14-2, R114   76-19-7, R218
     354-33-6, R125   359-35-3, R134 420-46-2, R143a
     430-66-0, R143 811-97-2, R134a   2837-89-0, R124   7664-41-7, Ammonia, uses
     RL: NUU (Other use, unclassified); USES (Uses)
        (evaluation of wet compression in refrigeration cycles working with pure or non-azeotropic refrigerant mixts. for air-conditioners)

RE.CNT 21   THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Anon; Number Designation and Safety Classification of Refrigerants 1992, P1
(2) Anon; Thermophysics Division, National Institute of Standards and Technology 1993
(3) Calm, J; Refrigerants for the 21st Century 1997, P6 CAPLUS
(4) Cavallini, A; IIR Bullitin 1994, V94(6), P2
(5) Cavallini, A; International Journal of Refrigeration 1996, V19(8), P485
(6) Domanski, P; ASHRAE Technical Data Bulletin 1993, V9(4), P21
(7) Itard, L; International Journal of Refrigeration 1995, V18(7), P495 CAPLUS
(8) Kondepudi, S; ASHRAE Technical Data Bulletin 1993, V9(4), P40
(9) Kruse, H; ASHRAE Technical Data Bullitin 1985, P96
(10) Linton, J; ASHRAE Technical Data Bulletin 1993, V9(4), P55
(11) Lorentzen, G; International Journal of Refrigeration 1995, V18(3), P190 CAPLUS
(12) Nagel, M; International Journal of Refrigeration 1995, V18(8), P534 CAPLUS
(13) Radermacher, R; ASHRAE Technical Data Bulletin 1993, V9(4), P1
(14) Rane, M; International Journal of Refrigeration 1993, V16(4), P258 CAPLUS
(15) Richardson, R; International Journal of Refrigeration 1995, V18(1), P58 CAPLUS
(16) Rowland, F; ASHRAE Journal 1997, P29
(17) Sand, J; ASHRAE Technical Data Bulletin 1993, V9(4), P12

(18) Sanvordenker, K; ASHRAE Technical Data Bulletin 1993, V9(4), P34
(19) Sanvordenker, K; Refrigerants for the 21st Century 1997, P111 CAPLUS
(20) Spatz, M; ASHRAE Technical Data Bulletin 1993, V9(4), P48
(21) Stoecker, W; Refrigeration and Air Conditioning 1982, P193

L15 ANSWER 46 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2002:449800 CAPLUS
DN 137:35396
ED Entered STN: 14 Jun 2002
TI Refrigerant compositions containing a compatibilizer
IN Minor, Barbara Haviland; Palmer, Keith Winfield
PA E. I. Du Pont de Nemours & Co., USA
SO PCT Int. Appl., 79 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C09K005-04
CC 51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 3

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002046328	A2	20020613	WO 2001-US46879	20011207
	WO 2002046328	A3	20030605		
	WO 2002046328	A9	20040304		
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	US 20030034477	A1	20030220	US 2001-10187	20011206
	US 6962665	B2	20051108		
	CA 2427597	A1	20020613	CA 2001-2427597	20011207
	AU 2002028845	A	20020618	AU 2002-28845	20011207
	EP 1341868	A2	20030910	EP 2001-989965	20011207
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	BR 2001016506	A	20040106	BR 2001-16506	20011207
	CN 1479772	A	20040303	CN 2001-820248	20011207
	JP 2004515600	T	20040527	JP 2002-548051	20011207
	CN 1900208	A	20070124	CN 2006-10081897	20011207
	TW 593656	B	20040621	TW 2001-90130524	20011210
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	MX 2003PA05033	A	20040524	MX 2003-PA5033	20030605
	NO 2003002590	A	20030625	NO 2003-2590	20030606
	US 20040222402	A1	20041111	US 2004-867306	20040614
PRAI	US 2000-254208P	P	20001208		
	US 2001-304552P	P	20010711		
	US 2001-10187	A	20011206		
	CN 2001-820248	A3	20011207		
	WO 2001-US46879	W	20011207		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2002046328	ICM	C09K005-04
	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
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NCL 252/068.000; 508/244.000

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EP 1341868 IPCI C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
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ECLA   C09K005/04B4; C10M169/04; C10M171/00R; M10M; M10N; M10N; M10N; M10N

US 20040222402 IPCI   C09K0005-00 [ICM,7]

IPCR   C09K0003-00 [I,C*]; C09K0003-00 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*]; C10M0101-02 [I,A]; C10M0105-00 [I,C*]; C10M0105-04 [I,A]; C10M0105-06 [I,A]; C10M0129-00 [I,C*]; C10M0129-16 [I,A]; C10M0129-24 [I,A]; C10M0131-00 [I,C*]; C10M0131-04 [I,A]; C10M0131-10 [I,A]; C10M0133-00 [I,C*]; C10M0133-16 [I,A]; C10M0133-24 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-04 [N,A]; C10N0040-30 [N,A]

NCL   252/068.000

ECLA   C09K005/04B4; C10M169/04; C10M171/00R; M10M; M10N; M10N; M10N; M10N

AB   The present invention provides compns. that are useful for compatibilizing a conventional, non-polar, compression refrigeration lubricant and a hydrofluorocarbon and/or hydrochlorofluorocarbon refrigerant in a compression refrigeration apparatus Addnl., these composition promote efficient return of lubricant from the non-compressor zones to the compressor zones of the aforesaid refrigeration apparatus

ST   compatibilizer refrigerant lubricant

IT   Alkanes, uses
RL: MOA (Modifier or additive use); USES (Uses)
(1,1,1-trifluoro; conventional, non-polar, compression refrigeration lubricant containing a compatibilizer)

IT   Isoalkanes
RL: MOA (Modifier or additive use); USES (Uses)
(C9-12; conventional, non-polar, compression refrigeration lubricant containing a compatibilizer)

IT   Ethers, uses
RL: MOA (Modifier or additive use); USES (Uses)
(aromatic; conventional, non-polar, compression refrigeration lubricant containing a compatibilizer)

IT   Hydrocarbons, uses
RL: MOA (Modifier or additive use); USES (Uses)
(chloro; conventional, non-polar, compression refrigeration lubricant containing a compatibilizer)

IT   Refrigerants
Solvent naphtha
(conventional, non-polar, compression refrigeration lubricant

containing a compatibilizer)
IT Amides, uses
Aromatic hydrocarbons, uses
Hydrocarbon oils
Ketones, uses
Naphtha
Naphthenes
Nitriles, uses
Polyolefins
Polyoxyalkylenes, uses
RL: MOA (Modifier or additive use); USES (Uses)
(conventional, non-polar, compression refrigeration lubricant
containing a compatibilizer)
IT Ethers, uses
RL: MOA (Modifier or additive use); USES (Uses)
(fluoroalkyl; conventional, non-polar, compression
refrigeration lubricant containing a compatibilizer)
IT Cinnamon (spice)
Citrus sinensis
Orange
(fragrance; conventional, non-polar, compression refrigeration
lubricant containing a compatibilizer)
IT Lubricants
(non-polar, compression refrigeration; conventional,
non-polar, compression refrigeration lubricant containing a
compatibilizer)
IT 75-10-5, HFC-32 75-37-6, HFC-152a 75-45-6, HCFC-22 78-93-3,
Methyl ethyl ketone, uses 98-86-2, Acetophenone, uses 100-66-3,
Methoxybenzene, uses 103-73-1, Ethoxybenzene 106-35-4, 3-Heptanone
106-68-3, 3-Octanone 107-87-9, Methyl propyl ketone 108-83-8,
Diisobutyl ketone 108-94-1, Cyclohexanone, uses 109-69-3,
1-Chlorobutane 110-43-0, 2-Heptanone 110-71-4, Ethylene glycol
dimethyl ether 111-13-7, 2-Octanone 111-76-2, Ethylene glycol butyl
ether 111-85-3, 1-Chlorooctane 112-25-4 112-34-5, Diethylene glycol
butyl ether 119-60-8, Dicyclohexyl ketone 124-12-9, 1-Cyanoheptane
141-04-8, Adipic acid, diisobutyl ester 151-10-0, 1,3-Dimethoxybenzene
354-33-6, HFC-125 420-46-2, HFC-143a 462-18-0, Dihexyl
ketone 495-40-9, Butyrophenone 502-42-1, Cycloheptanone 502-56-7,
5-Nonanone 544-10-5, 1-Chlorohexane 593-08-8, 2-Tridecanone
624-16-8, 4-Decanone 628-73-9, 1-Cyanopentane 629-06-1,
1-Chloroheptane 629-14-1, Ethylene glycol diethyl ether 693-54-9,
2-Decanone 759-22-8 761-65-9 764-84-1, 1,1,1-Trifluorododecane
811-97-2, HFC-134a 821-55-6, 2-Nonanone 918-84-3,
3-Chloro-3-methylpentane 925-06-4, Succinic acid, diisobutyl ester
942-92-7, Hexanophenone 1690-76-2, 1,3-Dimethyl piperid-2-one
2163-00-0, 1,6-Dichlorohexane 2243-27-8, 1-Cyanooctane 2244-07-7,
1-Cyanodecane 2437-25-4, 1-Cyanoundecane 2473-01-0, 1-Chlorononane
2556-73-2, 1-Methyl caprolactam 2570-96-9, 2-Cyanooctane 2687-94-7,
1-Octyl pyrrolidin-2-one 2687-96-9, 1-Dodecyl pyrrolidin-2-one
2837-89-0, HCFC-124 3470-98-2, 1-Butyl pyrrolidin-2-one 4737-41-1,
3-(Chloromethyl)pentane 4832-17-1, 2-Decalone 5441-51-0,
4-Ethylcyclohexanone 6837-24-7, 1-Cyclohexylpyrrolidin-2-one
7778-85-0, Propylene glycol dimethyl ether 9003-19-4, Polyvinyl ether
9038-95-3, Ucon 50HB100 10020-43-6 17337-12-1, 1,1,1-Trifluorohexane
19090-89-2 29387-86-8, Propylene glycol n-butyl ether 29387-87-9
29911-27-1, Dipropylene glycol propyl ether 30136-13-1 34590-94-8,
Dipropylene glycol methyl ether 35884-42-5, Dipropylene glycol butyl
ether 37672-43-8 55257-88-0 55934-93-5, Tripropylene glycol butyl
ether 60872-29-9, DMPD 64033-90-5 69226-89-7, Ucon LB-65
69300-15-8 71195-64-7 80763-10-6 86917-58-0 96077-04-2,
Tripropylene glycol propyl ether 99294-00-5, Exxate 700 110737-52-5,
Zerol 300 111109-77-4, Dipropylene glycol dimethyl ether 125624-30-8,

Zerol 150   133023-17-3, R410A   144423-06-3, Butanol, butoxy-
146732-63-0, R401A   150743-07-0, R404A   158675-78-6, R407C
231289-57-9, HAB 22   406913-95-9, Arctic EAL 22   437552-24-4
437552-25-5   437552-26-6   437552-27-7   437552-28-8   437552-29-9
437610-77-0, Emkarate RL 32   437610-86-1, Zerol 75   437610-89-4, Zerol
200TD   437611-57-9, Ucon 488
RL: MOA (Modifier or additive use); USES (Uses)
(conventional, non-polar, compression refrigeration lubricant
containing a compatibilizer)

L15 ANSWER 47 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   2002:334995 CAPLUS
DN   137:142344
ED   Entered STN: 06 May 2002
TI   Surface tension correlation for binary HFC mixtures
AU   Duan, Yuanyuan; Lin, Hong
CS   Dep. Thermal Eng., Tsinghua Univ., Beijing, 100084, Peop. Rep. China
SO   Qinghua Daxue Xuebao, Ziran Kexueban (2001), 41(12), 99-102
CODEN: QDXKE8; ISSN: 1000-0054
PB   Qinghua Daxue Chubanshe
DT   Journal
LA   Chinese
CC   48-5 (Unit Operations and Processes)
Section cross-reference(s): 66, 69
AB   Surface tension is a basic thermophys. property which affects the heat transfer and fluid bubbles attached to the surface. Surface tension data for hydrofluorocarbon (HFC) mixts., which are considered as refrigerant alternatives, is necessary for proper design of air conditioners and refrigeration equipment. The available exptl. data are used to develop correlations for the surface tension of HFC mixts. The correlations are also able to represent the surface tension of corresponding pure refrigerants. The correlations were compared with published ones. These correlations accurately represent the exptl. data over a wide temperature range with accuracy that can satisfy the requirements of
engineering applications.
ST   hydrofluorocarbon refrigerant binary mixt surface tension correlation; air conditioner hydrofluorocarbon refrigerant binary mixt surface tension; refrigerator hydrofluorocarbon refrigerant binary mixt surface tension
IT   Refrigerants
Surface tension
(correlation for surface tension of hydrofluorocarbon refrigerant
binary mixts.)
IT   75-10-5, R32, Refrigerant   75-37-6, R152a 354-33-6,
R125 420-46-2, R143a 811-97-2, R134a
RL: PRP (Properties); TEM (Technical or engineered material use); USES
(Uses)
(correlation for surface tension of hydrofluorocarbon refrigerant
binary mixts.)

L15 ANSWER 48 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   2002:256407 CAPLUS
DN   136:296540
ED   Entered STN: 05 Apr 2002
TI   Fluorocarbon refrigerant compositions
IN   Singh, Rajiv R.; Spatz, Mark W.; Richard, Robert G.; Thomas, Raymond G.;
Wilson, David P.
PA   Honeywell International Inc., USA
SO   PCT Int. Appl., 21 pp.
CODEN: PIXXD2
DT   Patent

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LA   English
IC   ICM  C09K005-04
CC   45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
FAN.CNT 3
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
     ---------------     ----   --------   --------------------   --------
PI   WO 2002026913        A2    20020404   WO 2001-US30276        20010927
     WO 2002026913        A3    20020530
         W:  AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU,
             CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL,
             IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA,
             MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI,
             SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW
         RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,
             DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF,
             BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG
     AU 2001093146        A     20020408   AU 2001-93146          20010927
PRAI US 2000-235847P      P     20000927
     WO 2001-US30276      W     20010927
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 2002026913   ICM    C09K005-04
                 IPCI   C09K0005-04 [ICM]; C09K0005-00 [ICM,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
                 ECLA   C09K005/04B4B
 AU 2001093146   IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
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AB   Invention provides fluorocarbon refrigerant compns. that offer alternatives, and are considered environmentally safe substitutes, for CFC's and HCFC's. The compns. of the invention are useful as refrigerants, including for use in chillers, aerosol propellants, metered dose inhalers, heat transfer media, gaseous dielecs., fire extinguishing agents, foam blowing agents, solvents and sterilants. The compns. of the invention are soluble in lubricating oils and are, therefore, particularly useful as R-22 retrofit fluids.


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ST   safe fluorocarbon refrigerant compn
IT   Aerosols
        (Propellants; fluorocarbon refrigerant compns.)
IT   Propellants (sprays and foams)
        (aerosol; fluorocarbon refrigerant compns.)
IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro; fluorocarbon refrigerant compns.)
IT   Blowing agents
     Electric insulators
     Fire extinguishers
       Foams
     Refrigerants
        (fluorocarbon refrigerant compns.)
IT   Paraffin oils
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluorocarbon refrigerant compns.)
IT   Polyisocyanurates
     Polyurethanes, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (foams; fluorocarbon refrigerant compns. for)
IT   182971-48-8, R 414A
     RL: TEM (Technical or engineered material use); USES (Uses)
        (R 414B, refrigerant; fluorocarbon refrigerant compns.)
IT   158675-81-1, R 409A
     RL: TEM (Technical or engineered material use); USES (Uses)
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(refrigerant, R 409B; fluorocarbon refrigerant compns.)
IT 158675-80-0, R 508A
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerant, R 508B; fluorocarbon refrigerant compns.)
IT 74-87-3, Chloromethane, uses 75-09-2, Dichloromethane, uses 76-16-4, Hexafluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerant, solubilizing agent; fluorocarbon refrigerant compns.)
IT 75-10-5, Difluoromethane 75-43-4, Dichlorofluoromethane 75-45-6, Chlorodifluoromethane 75-46-7, Trifluoromethane 75-68-3, 1,Chloro-1,1-difluoroethane 75-69-4, Trichlorofluoromethane 75-71-8, Dichlorodifluoromethane 75-72-9, Chlorotrifluoromethane 75-73-0, Tetrafluoromethane 76-13-1 76-14-2, 1,2-Dichloro-1,1,2,2-tetrafluoroethane 76-15-3 76-19-7, Octafluoropropane 115-25-3, Octafluorocyclobutane 306-83-2, 2,2-Dichloro-1,1,1-trifluoroethane 354-25-6, 1-Chloro-1,1,2,2-tetrafluoroethane 354-33-6, Pentafluoroethane 406-58-6, 1,1,1,3,3-Pentafluorobutane 420-46-2 , 1,1,1-Trifluoroethane 430-66-0 431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane 460-73-1, 1,1,1,3,3-Pentafluoropropane 593-53-3, Fluoromethane 593-70-4, Chlorofluoromethane 690-39-1, 1,1,1,3,3,3-Hexafluoropropane 811-97-2, 1,1,1,2-Tetrafluoroethane 1717-00-6, 1,1-Dichloro-1-fluoroethane 39432-81-0, R-502 50815-73-1, R-503 56275-41-3, R-500 56275-42-4, R-505 56275-43-5, R-506 57197-42-9, R 400 60382-53-8, R-504 70281-30-0, R 501 133023-17-3, R-410A 146732-63-0, R-401A 149437-06-9, R-402A 149437-07-0, R-403B 150621-87-7, R-507A 150743-07-0, R-404A 158675-77-5, R-406A 158675-78-6, R-407A 158675-79-7, R-408A 164671-97-0, R 405A 174819-20-6, R-411A 188653-05-6, R-413A 406214-80-0, R 412A 406214-81-1, R 509A
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerant; fluorocarbon refrigerant compns.)
IT 60-29-7, Ethyl ether, uses 74-82-8, Methane, uses 74-84-0, Ethane, uses 74-85-1, Ethylene, uses 74-98-6, Propane, uses 75-28-5, Isobutane 75-37-6, 1,1-Difluoroethane 78-78-4, Isopentane 106-97-8, Butane, uses 107-31-3, Methyl formate 109-66-0, Pentane, uses 115-07-1, Propylene, uses 115-10-6, Dimethyl ether 124-38-9, Carbon dioxide, uses 287-92-3, Cyclopentane 353-36-6, Fluoroethane 463-82-1, Neopentane 2314-97-8, Iodotrifluoromethane 2551-62-4, Sulfur hexafluoride 3822-68-2, Pentafluorodimethyl ether 25190-06-1, Polybutylene glycol
RL: TEM (Technical or engineered material use); USES (Uses)
(solubilizing agent; fluorocarbon refrigerant compns.)

L15 ANSWER 49 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2002:253045 CAPLUS
DN 136:281781
ED Entered STN: 05 Apr 2002
TI Hydrofluorocarbon refrigerant compositions soluble in lubricating oil
IN Singh, Rajiv Ratna; Wilson, David Paul; Thomas, Raymond Hilton Percival; Richard, Robert Gerard
PA Honeywell International Inc., USA
SO Eur. Pat. Appl., 13 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM C09K005-04
CC 51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 3

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1193305	A1	20020403	EP 2000-310474	20001124

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,

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            IE, SI, LT, LV, FI, RO
     US 6526764          B1    20030304   US 2000-670738         20000927
PRAI US 2000-670738      A     20000927
     US 2000-235847P     P     20000927
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 EP 1193305      ICM    C09K005-04
                 IPCI   C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0171-00
                        [I,C*]; C10M0171-00 [I,A]
                 ECLA   C09K005/04B4B; C10M171/00R
 US 6526764      IPCI   F25D0021-12 [ICM,7]; F25D0021-06 [ICM,7,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
                 NCL    062/084.000; 062/077.000; 062/114.000; 252/067.000;
                        252/068.000
                 ECLA   C09K005/04B4B
AB   Hydrofluorocarbon refrigerants are not soluble in hydrocarbon oil.
     Retrofitting refrigeration equipment with hydrofluorocarbons
     generally entails the use of expensive polyol ester (POE) lubricants.  The
     invention provides hydrofluorocarbon refrigerant compns. that are soluble in
     hydrocarbon oil thus allowing for a simpler and less expensive retrofit
     option to the refrigerant user.
ST   hydrofluorocarbon refrigerant oil soluble
IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro, hydrofluorocarbons; hydrofluorocarbon refrigerant compns. soluble
        in lubricating oil)
IT   Lubricating oils
     Refrigerants
        (hydrofluorocarbon refrigerant compns. soluble in lubricating oil)
IT   Hydrocarbon oils
     Paraffin oils
     RL: TEM (Technical or engineered material use); USES (Uses)
        (hydrofluorocarbon refrigerant compns. soluble in lubricating oil)
IT   Hydrocarbon oils
     RL: TEM (Technical or engineered material use); USES (Uses)
        (white oils; hydrofluorocarbon refrigerant compns. soluble in lubricating
        oil)
IT   158675-81-1, R 409A
     RL: TEM (Technical or engineered material use); USES (Uses)
        (R 409A, R 409B; hydrofluorocarbon refrigerant compns. soluble in
        lubricating oil)
IT   182971-48-8, R 414A
     RL: TEM (Technical or engineered material use); USES (Uses)
        (R 414A, R 414B; hydrofluorocarbon refrigerant compns. soluble in
        lubricating oil)
IT   158675-80-0, R 508A
     RL: TEM (Technical or engineered material use); USES (Uses)
        (R 508A, R 508B; hydrofluorocarbon refrigerant compns. soluble in
        lubricating oil)
IT   71-43-2D, Benzene, alkyl derivs. 75-10-5, R-32   75-28-5,
     Isobutane   106-97-8, Butane, uses   109-66-0, Pentane, uses   115-10-6,
     Dimethyl ether 354-33-6, R-125 420-46-2, R-143a
     811-97-2, R-134a   9002-86-2, R-501   39432-81-0, R-502
     50815-73-1, R-503   56275-41-3, R-500   56275-42-4, R-505   56275-43-5,
     R-506   60382-53-8, R-504   133023-17-3, R-410A   146732-63-0, R-401B
     149437-06-9, R-402A   149437-07-0, R 403A   150621-87-7, R-507A
     150743-07-0, R-404A   158675-77-5, R-406A   158675-78-6, R-407A
     158675-79-7, R-408A   164671-97-0, R 405A   174819-20-6, R-411A
     188653-05-6, R-413A   406214-80-0, R 412A   406214-81-1, R 509A
     RL: TEM (Technical or engineered material use); USES (Uses)
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(hydrofluorocarbon refrigerant compns. soluble in lubricating oil)
RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Ausimont Spa; EP 0638623 A 1995 CAPLUS
(2) Daikin Ind Ltd; EP 0598907 A 1994 CAPLUS
(3) Ici Plc; GB 2274463 A 1994 CAPLUS
(4) Lounis, S; US 4862699 A 1989
(5) Lower, R; US 4364236 A 1982
(6) Nippon Mitsubishi Oil Corp; EP 1018538 A 2000 CAPLUS
(7) Sanyo Electric Co; EP 0659862 A 1995 CAPLUS
(8) Thomas, M; WO 9603473 A 1996 CAPLUS
(9) Yokozeki, A; US 5516446 A 1996 CAPLUS

L15 ANSWER 50 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2002:10783 CAPLUS
DN 136:71858
ED Entered STN: 04 Jan 2002
TI Mixed refrigerant temperature control using a pressure regulating valve
IN Flynn, Kevin P.; Podtcherniaev, Oleg
PA IGC Polycold Systems, Inc., USA
SO PCT Int. Appl., 28 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM F25B009-00
ICS F25B041-04
CC 48-5 (Unit Operations and Processes)
FAN.CNT 6

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002001121	A1	20020103	WO 2001-US20550	20010628
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	US 20020035841	A1	20020328	US 2001-894964	20010628
	US 6560981	B2	20030513		
	US 20030115894	A1	20030626	US 2002-316176	20021210
	US 6722145	B2	20040420		
	US 20030217565	A1	20031127	US 2003-412750	20030411
	US 6886361	B2	20050503		
PRAI	US 2000-214565P	P	20000628		
	US 2000-214562P	P	20000628		
	US 2001-894965	B2	20010628		
	US 2001-894979	B3	20010628		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2002001121	ICM	F25B009-00
	ICS	F25B041-04
	IPCI	F25B0009-00 [ICM,7]; F25B0041-04 [ICS,7]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; F25B0009-00 [I,C*]; F25B0009-00 [I,A]; F25B0039-02 [I,C*]; F25B0039-02 [I,A]; F25B0041-04 [I,C*]; F25B0041-04 [I,A]; F25D0031-00 [N,C*]; F25D0031-00 [N,A]; F28D0007-00 [I,C*]; F28D0007-02 [I,A]
	ECLA	C09K005/04B4B; F25B009/00B4; F25B039/02; F25B041/04B;

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                         F28D007/02D; R25B; R25D
 US 20020035841  IPCI    F25B0001-00 [ICM,7]; F25B0041-04 [ICS,7]
                 IPCR    C09K0005-00 [I,C*]; C09K0005-04 [I,A]; F25B0009-00
                         [I,C*]; F25B0009-00 [I,A]; F25B0039-02 [I,C*];
                         F25B0039-02 [I,A]; F25B0041-04 [I,C*]; F25B0041-04
                         [I,A]; F25B0047-02 [N,C*]; F25B0047-02 [N,A];
                         F25D0031-00 [N,C*]; F25D0031-00 [N,A]; F28D0007-00
                         [I,C*]; F28D0007-02 [I,A]
                 NCL     062/217.000; 062/502.000; 252/067.000
                 ECLA    C09K005/04B4B; F25B009/00B4; F25B039/02; F25B041/04B;
                         F28D007/02D; R25B; R25B; R25D
 US 20030115894  IPCI    F25B0041-04 [ICM,7]
                 IPCR    C09K0005-00 [I,C*]; C09K0005-04 [I,A]; F25B0009-00
                         [I,C*]; F25B0009-00 [I,A]; F25B0039-02 [I,C*];
                         F25B0039-02 [I,A]; F25B0041-04 [I,C*]; F25B0041-04
                         [I,A]; F25D0031-00 [N,C*]; F25D0031-00 [N,A];
                         F28D0007-00 [I,C*]; F28D0007-02 [I,A]
                 NCL     062/217.000; 252/067.000
                 ECLA    C09K005/04B4B; F25B009/00B4; F25B039/02; F25B041/04B;
                         F28D007/02D; R25B; R25B; R25D
 US 20030217565  IPCI    F25D0017-02 [ICM,7]; F25D0017-00 [ICM,7,C*];
                         F25B0043-02 [ICS,7]; F28F0019-00 [ICS,7]; F28D0007-12
                         [ICS,7]; F28D0007-10 [ICS,7,C*]
                 IPCR    C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C09K0005-10
                         [I,A]; F25B0009-00 [I,C*]; F25B0009-00 [I,A];
                         F25B0039-02 [I,C*]; F25B0039-02 [I,A]; F25B0041-04
                         [I,C*]; F25B0041-04 [I,A]; F25D0031-00 [N,C*];
                         F25D0031-00 [N,A]; F28D0007-00 [I,C*]; F28D0007-02
                         [I,A]
                 NCL     062/430.000; 062/515.000; 165/164.000; 062/434.000;
                         062/470.000; 165/041.000; 165/134.100; 165/155.000;
                         165/156.000; 165/161.000; 165/291.000
                 ECLA    C09K005/04B4B; C09K005/10; F25B009/00B4; F25B039/02;
                         F25B041/04B; F28D007/02D; R25B; R25D
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AB   A standard refrigeration pressure regulating valve limits the min. temperature produced by a refrigeration process, which uses a refrigerant mixture including at least two components whose normal b.ps. differ by at least 50°. Limiting the lowest temperature prevents freeze-out of the refrigerant.

ST   refrigeration process pressure regulating valve temp control

IT   Refrigeration
   (mixed refrigerant temperature control using a pressure regulating valve)

IT   Valves
   (pressure regulating; mixed refrigerant temperature control using a pressure regulating valve)

IT   74-84-0, Ethane, uses 75-10-5, R-32   75-37-6, R-152a   75-46-7, R-23   75-73-0, R-14   76-19-7, R-218 354-33-6, R-125 420-46-2, R-143a   431-63-0, R-236Ea   431-89-0, R-227Ea 460-73-1, R-245Fa   678-26-2, R-4112   679-86-7, R-245Ca   690-39-1, R-236Fa 811-97-2, R-134a   7440-37-1, Argon, uses   7727-37-9, Nitrogen, uses   119450-61-2, R-347   138495-42-8, R-4310Meec
RL: TEM (Technical or engineered material use); USES (Uses)
   (mixed refrigerant temperature control using a pressure regulating valve)

RE.CNT 6   THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Bonaquist, D; US 6076372 A 2000 CAPLUS
(2) Cowart, D; US 5918476 A 1999
(3) Little, W; US 5644502 A 1997 CAPLUS
(4) Tyree, L; US 4045972 A 1977
(5) Voetsch Industrietechnik Gmbh; DE 19818627 A 1999 CAPLUS
(6) Yamashita, T; US 5499508 A 1996

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L15  ANSWER 51 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2001:747918  CAPLUS
DN   135:291075
ED   Entered STN:  12 Oct 2001
TI   Aromatic acid-aliphatic ester-based synthetic base oils as compressor
     lubricating oils for refrigeration units containing
     hydrofluorocarbon refrigerants
IN   Millman, Gregg M.
PA   ICI Americas Inc., USA
SO   PCT Int. Appl., 11 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM  C10M105-34
     ICS  C10M129-70; C10M171-00; C09K005-04; F25B031-00; F01M011-06
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   WO 2001074977        A2    20011011    WO 2001-US10152        20010329
     WO 2001074977        A3    20020207
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,
             CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,
             HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT,
             LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU,
             SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN,
             YU, ZA, ZW
         RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,
             DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF,
             BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG
     AU 2001051111        A     20011015    AU 2001-51111          20010329
PRAI US 2000-193498P      P     20000331
     WO 2001-US10152      W     20010329
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 2001074977   ICM    C10M105-34
                 ICS    C10M129-70; C10M171-00; C09K005-04; F25B031-00;
                        F01M011-06
                 IPCI   C10M0105-34 [ICM,7]; C10M0105-00 [ICM,7,C*];
                        C10M0129-70 [ICS,7]; C10M0129-00 [ICS,7,C*];
                        C10M0171-00 [ICS,7]; C09K0005-04 [ICS,7]; C09K0005-00
                        [ICS,7,C*]; F25B0031-00 [ICS,7]; F01M0011-06 [ICS,7];
                        F01M0011-00 [ICS,7,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00
                        [I,C*]; C10M0105-34 [I,A]; C10M0129-00 [I,C*];
                        C10M0129-70 [I,A]; C10M0171-00 [I,C*]; C10M0171-00
                        [I,A]; F01P0011-00 [I,C*]; F01P0011-06 [I,A];
                        F25B0031-00 [I,C*]; F25B0031-00 [I,A]; F25B0045-00
                        [N,C*]; F25B0045-00 [N,A]; F25B0047-00 [N,C*];
                        F25B0047-00 [N,A]
                 ECLA   C09K005/04B; C10M105/34; C10M129/70; C10M171/00R;
                        F01P011/06; F25B031/00B; R25B; R25B
 AU 2001051111   IPCI   C10M0105-34 [ICM,7]; C10M0105-00 [ICM,7,C*];
                        C10M0129-70 [ICS,7]; C10M0129-00 [ICS,7,C*];
                        C10M0171-00 [ICS,7]; C09K0005-04 [ICS,7]; C09K0005-00
                        [ICS,7,C*]; F25B0031-00 [ICS,7]; F01M0011-06 [ICS,7];
                        F01M0011-00 [ICS,7,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00
                        [I,C*]; C10M0105-34 [I,A]; C10M0129-00 [I,C*];
                        C10M0129-70 [I,A]; C10M0171-00 [I,C*]; C10M0171-00
                        [I,A]; F01P0011-00 [I,C*]; F01P0011-06 [I,A];
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F25B0031-00 [I,C*]; F25B0031-00 [I,A]; F25B0045-00 [N,C*]; F25B0045-00 [N,A]; F25B0047-00 [N,C*]; F25B0047-00 [N,A]

OS MARPAT 135:291075

AB Synthetic lubricating oils especially for use in refrigerating systems with HFC (hydrofluorocarbon) refrigerants are comprised of C1-15-monoaliph. esters of an aromatic monocarboxylic acid, with a viscosity of 1-15 cSt at 40°. Suitable esters include 2-ethylhexyl benzoate, hexyl benzoate, Bu benzoate, iso-Pr benzoate, and Et benzoate. The ester oils can contain 0.0001-10 weight% additives.

ST ester lubricating oil hydrofluorocarbon refrigerant; refrigeration synthetic lubricating oil hydrofluorocarbon refrigerant; ethylhexyl benzoate compressor lubricating oil

IT Carboxylic acids, uses
RL: NUU (Other use, unclassified); USES (Uses)
(aromatic, esters, C1-15-alkyl esters, base oils; aromatic acid-aliphatic ester-based synthetic base oils as compressor lubricating oils for refrigeration units containing hydrofluorocarbon refrigerants)

IT Lubricating oils
(base oils, synthetic; aromatic acid-aliphatic ester-based synthetic base oils as compressor lubricating oils for refrigeration units containing hydrofluorocarbon refrigerants)

IT Lubricating oils
(compressor; aromatic acid-aliphatic ester-based synthetic base oils as compressor lubricating oils for refrigeration units containing hydrofluorocarbon refrigerants)

IT Hydrocarbons, uses
RL: NUU (Other use, unclassified); USES (Uses)
(fluoro, refrigerants; aromatic acid-aliphatic ester-based synthetic base oils as compressor lubricating oils for refrigeration units containing hydrofluorocarbon refrigerants)

IT 93-89-0, Ethyl benzoate 136-60-7, Butyl benzoate 939-48-0, Isopropyl benzoate 5444-75-7, 2-Ethylhexyl benzoate 6789-88-4, Hexyl benzoate
RL: NUU (Other use, unclassified); USES (Uses)
(base oils; aromatic acid-aliphatic ester-based synthetic base oils as compressor lubricating oils for refrigeration units containing hydrofluorocarbon refrigerants)

IT 75-10-5, R-32 (refrigerant) 75-37-6, 1,1-Difluoroethane 354-33-6, Pentafluoroethane 420-46-2, 1,1,1-Trifluoroethane 811-97-2, 1,1,1,2-Tetrafluoroethane
RL: NUU (Other use, unclassified); USES (Uses)
(refrigerants; aromatic acid-aliphatic ester-based synthetic base oils as compressor lubricating oils for refrigeration units containing hydrofluorocarbon refrigerants)

L15 ANSWER 52 OF 175 CAPLUS

AN 2001:595211 CAPLUS

DN 135:158365

ED Entered STN: 17 Aug 2001

TI Reliable heat capacity values of saturated vapor for HFC refrigerants

AU Narukawa, K.; Sato, H.

CS Department of System Design Engineering Faculty of Science and Technology, Keio University, Kohoku-ku, Yokohama, Japan

SO International Congress of Refrigeration: Refrigeration into the Third Millennium, 20th, Sydney, Australia, Sept. 19-24, 1999 (1999), 678-684
Publisher: International Institute of Refrigeration, Paris, Fr.
CODEN: 69BQLX

DT Conference; (computer optical disk)

LA English

CC 69-2 (Thermodynamics, Thermochemistry, and Thermal Properties)
Section cross-reference(s): 45, 65

AB The number of exptl. data for the thermodn. properties of HFCs far exceeds

that for CFCs. Various equations of state with high reliability are reported for HFCs based on these exptl. data. Since measurements near saturation at low temps. are missing, there are great differences of up to 7% among the heat capacity values calculated from different existing equations of state in the gaseous phase near the saturation line. It is important to determine reliable heat capacity values not only for the field of refrigeration engineering but also for the academic field for developing reliable equations of state. In this study, regarding R-32, R-125, R-134a, and R-143a, we have discussed virial equations of state that can represent the rational behavior of the heat capacity from a phys. viewpoint based not only on highly accurate speed-of-sound measurements but also on virial coeffs. theor. calculated from the Stockmayer potential.

ST heat capacity satd vapor hydrofluorocarbon refrigerant; equation state hydrofluorocarbon refrigerant heat capacity; speed sound hydrofluorocarbon refrigerant heat capacity; virial coeff hydrofluorocarbon refrigerant heat capacity

IT Hydrocarbons, properties
RL: PRP (Properties)
(fluoro; reliable heat capacity values of saturated vapor for HFC refrigerants)

IT Heat capacity
Isochoric heat capacity
Refrigerants
(reliable heat capacity values of saturated vapor for HFC refrigerants)

IT Equation of state
Virial coefficient
(reliable heat capacity values of saturated vapor for HFC refrigerants based on)

IT Sound and Ultrasound
(velocity; reliable heat capacity values of saturated vapor for HFC refrigerants based on measurements of)

IT 75-10-5, R-32 354-33-6, R-125 420-46-2, R-143a
811-97-2, R-134a
RL: PRP (Properties)
(reliable heat capacity values of saturated vapor for HFC refrigerants)

RE.CNT 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Aoyama, H; J Chem Eng Data 1996, V41(5), P1046 CAPLUS
(2) Baehr, H; J Chem Thermodyn 1991, V23, P1063 CAPLUS
(3) de Vries, B; Thermodynamic properties of alternative refrigerants R-32, R-125, and R-143a -measurements and equation of state- (in German) 1997, 55
(4) Dressner, M; Thermal mixing effects in binary gas mixtures with new refrigerants (in German) 1993, Series 3, no 332
(5) Gillis, K; Int J Thermophys 1997, V18(1), P73 CAPLUS
(6) Goodwin, A; J Chem Phys 1990, V93(4), P2741 CAPLUS
(7) Hozumi, T; J Chem Eng Data 1994, V39(3), P493 CAPLUS
(8) Ichikawa, T; Proc of the 5th Asian Thermophys Prop Conf 1998, V2, P535
(9) Kuwabara, S; J Chem Eng Data 1995, V40(1), P112 CAPLUS
(10) Li, J; to appear in Int J Thermophys 1999
(11) Moldover, M; J Res Natl Bur Stand 1988, V93(2), P85 CAPLUS
(12) Tillner-Roth, R; J Chem Thermodyn 1992, V24, P413 CAPLUS
(13) Yokozeki, A; Int J Thermophys 1998, V19(1), P89 CAPLUS
(14) Yoshida, M; Proc of the 30th Japanese Joint Conf on Air-conditioning and Refrig 1996, P105
(15) Zhang, H; J Chem Eng Data 1996, V41(6), P1401 CAPLUS
(16) Zhang, H; Proc of the 19th Int Cong of Refrigeration 1995, P622 CAPLUS

L15 ANSWER 53 OF 175 CAPLUS
AN 2001:593424 CAPLUS
DN 135:154451
ED Entered STN: 16 Aug 2001

TI Design and construction of a cascade refrigeration plant for the energetic investigation of natural working fluid combinations
AU Steimle, Fritz; Flacke, Norbert; Kloecker, Karsten
CS Institut fuer Angewandte Thermodynamik und Klimatechnik (IATK), Universitat GH Essen, Essen, 45141, Germany
SO International Congress of Refrigeration: Refrigeration into the Third Millennium, 20th, Sydney, Australia, Sept. 19-24, 1999 (1999), 372-378
Publisher: International Institute of Refrigeration, Paris, Fr.
CODEN: 69BQLX
DT Conference; (computer optical disk)
LA English
CC 47-4 (Apparatus and Plant Equipment)
Section cross-reference(s): 59
AB In almost all areas of air conditioning, refrigeration and heat pump technol., the refrigerants R12, R22, R502 and R13B1 were used for cooling applications in the temperature range from -20 to -60°C. Today R12, R502 and R13B1 may not be used any more in new installations in accordance with the German CFC regulation. Also the at present privileged substitute R22 will only be available in new installations until the end of 1999 in Germany. Substitutes like R32, R125, R134a, R143a, R152a and in particular their mixts. are favored at the moment. These refrigerants have no ozone depletion potential and are accepted as long-term alternatives from this point of view. However, these synthetic alternatives have a neg. effect on the environment due to their global warming potential. They are therefore not regarded to be a permanent solution Natural working fluids like ammonia, hydrocarbons, water, air and carbon dioxide are naturally present in the biosphere, have demonstrated their harmlessness and represent the only alternative from an environmental viewpoint. For this reason the high pressure refrigerant carbon dioxide is used for the production of low temps. by means of a cascade refrigeration plant. For the high temperature circuit of the cascade the refrigerant propane is applied. Alternatively for refrigeration at temps. lower than -55°C the cascade is examined with the working fluid combination propane/ethane. The investigations are to show that in spite of the higher tech. effort of a cascade refrigeration plant an environmentally friendly and acceptable from an energetic viewpoint solution is possible.
ST natural refrigerant cascade refrigerator air pollution control
IT Air pollution
(control; design and construction of cascade refrigeration plant for energetic investigation of natural working fluid combinations)
IT Air conditioners
Heat pumps
Refrigerants
Refrigerating apparatus
(design and construction of cascade refrigeration plant for energetic investigation of natural working fluid combinations)
IT Air
(natural refrigerant; design and construction of cascade refrigeration plant for energetic investigation of natural working fluid combinations)
IT Hydrocarbons, uses
RL: DEV (Device component use); USES (Uses)
(natural refrigerant; design and construction of cascade refrigeration plant for energetic investigation of natural working fluid combinations)
IT 124-38-9, Carbon dioxide, uses 7664-41-7, Ammonia, uses 7732-18-5, Water, uses
RL: DEV (Device component use); USES (Uses)
(natural refrigerant; design and construction of cascade refrigeration plant for energetic investigation of natural

working fluid combinations)

IT 74-84-0, Ethane, uses 74-98-6, Propane, uses 75-10-5, R32
75-37-6, R152a 75-45-6, R22 75-63-8, R13B1 75-71-8, R12
354-33-6, R125 420-46-2, R143a 811-97-2, R134a
39432-81-0, R502
RL: DEV (Device component use); USES (Uses)
(refrigerant; design and construction of cascade refrigeration plant for energetic investigation of natural working fluid combinations)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Ahnefeld, G; Anlagenleistungsmessungen einstufiger Prozesse mit R22, R404A, R407C und R507 1998
(2) Flacke, N; Dissertation, Institut fur Angewandte Thermodynamik und Klimatechnik, Universitat GH Essen 1999
(3) Steimle, F; Entwurf einer Kompressionskalteanlage in Kaskadenschaltung zur energetischen Untersuchung naturlicher Arbeitsstoffkombinationen R290/R744 und R290/R170 fur die Tieftemperaturanwendung 1998

L15 ANSWER 54 OF 175 CAPLUS
AN 2001:552961 CAPLUS
DN 135:109215
ED Entered STN: 01 Aug 2001
TI Refrigerant for middle- or low-temperature refrigerating system
IN Zhu, Mingshan; Shi, Lin; Han, Lizhong; Ye, Mao
PA Qinghua Univ., Peop. Rep. China; Beijing Jingshang Qinghua Refrigeration Technique Co., Ltd.
SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 7 pp.
CODEN: CNXXEV
DT Patent
LA Chinese
IC ICM C09K005-04
CC 48-5 (Unit Operations and Processes)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1279266	A	20010110	CN 2000-121160	20000728
	CN 1111193	C	20030611		
PRAI	CN 2000-121160		20000728		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
CN 1279266	ICM	C09K005-04
	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]

AB The refrigerant contains: propane (R290) 5-25, chlorodifluoromethane (HCFC-22) 40-80 and 1,1,1,2-tetrafluoroethane (HFC-134a) [or 1,1,1,2,3,3,3-heptafluoropropane (HFC-227ea)] 5-40 weight%. Alternatively, (1) the refrigerant may contain: R290 5-30, pentafluoroethane (HFC-125) 30-90, and difluoromethane (HFC-32) [or 1,1,1-trifluoroethane (HFC-143a)] 5-40 weight%; or (2) the refrigerant may also contain: (a) R290 5-30, HFC-125 30-70, HFC-32 5-50 and HFC-134a 5-35 weight%, or (b) R290 5-30, HFC-125 30-70, HFC-32 5-50 and trifluoroiodomethane (FC-1311) 5-35 weight%, or (c) R290 5-30, HFC-134a 30-70, HFC-32 5-50 and FC-1311 5-35 weight%, or (d) R290 5-30, HFC-125 30-70, HFC-143a 5-50 and FC-1311 5-35 weight%.

ST refrigerant refrigerating system; propane chlorodifluoromethane tetrafluoroethane refrigerant refrigerating system; heptafluoropropane propane chlorodifluoromethane refrigerant refrigerating system

IT Refrigerants
Refrigerating apparatus
(refrigerant for middle- or low-temperature refrigerating system)

IT   74-98-6, R290, uses 75-10-5, HFC-32   75-45-6, HCFC-22
     354-33-6, HFC-125 420-46-2, HFC-143a   431-89-0,
     HFC-227ea 811-97-2, HFC-134a   2314-97-8, Trifluoroiodomethane
     RL: TEM (Technical or engineered material use); USES (Uses)
        (refrigerant containing; refrigerant for middle- or low-temperature
        refrigerating system)

L15 ANSWER 55 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   2001:312421 CAPLUS
DN   134:327597
ED   Entered STN: 02 May 2001
TI   PVC foams using gaseous HFC
IN   Zerafati, Saeid; Crooker, Richard M.; Wu, Jinhuang; Tran, Michael Q.
PA   ATOFINA Chemicals, Inc., USA
SO   U.S., 3 pp.
     CODEN: USXXAM
DT   Patent
LA   English
IC   ICM C08J009-14
INCL 521098000
CC   38-3 (Plastics Fabrication and Uses)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6225365	B1	20010501	US 2000-552054	20000419
	EP 1148087	A2	20011024	EP 2001-301142	20010209
	EP 1148087	A3	20011219		
	EP 1148087	B1	20051109		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	ES 2250309	T3	20060416	ES 2001-301142	20010209
	CA 2335263	A1	20011019	CA 2001-2335263	20010212
	CN 1318459	A	20011024	CN 2001-108878	20010227
	JP 2001302836	A	20011031	JP 2001-95513	20010329
	MX 2001PA03927	A	20020415	MX 2001-PA3927	20010419
PRAI	US 2000-552054	A	20000419		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 6225365	ICM	C08J009-14
	INCL	521098000
	IPCI	C08J0009-14 [ICM,7]; C08J0009-00 [ICM,7,C*]
	IPCR	C08J0009-00 [I,C*]; C08J0009-14 [I,A]
	NCL	521/098.000; 521/079.000; 521/145.000
	ECLA	C08J009/14H2F+L26/06
EP 1148087	IPCI	C08J0009-14 [ICM,7]; C08J0009-00 [ICM,7,C*]; C08L0027-06 [ICA,6]; C08L0027-06 [ICS,7]; C08L0027-00 [ICS,7,C*]
	IPCR	C08J0009-00 [I,C*]; C08J0009-14 [I,A]
	ECLA	C08J009/14H2F+L26/06
ES 2250309	IPCI	C08L0027-06 [ICS,4]; C08L0027-00 [ICS,4,C*]; C08J0009-14 [ICS,4]; C08J0009-00 [ICS,4,C*]
	IPCR	C08J0009-00 [I,C*]; C08J0009-14 [I,A]
	ECLA	C08J009/14H2F+L26/06
CA 2335263	IPCI	C08J0009-14 [ICM,7]; C08F0114-06 [ICS,7]; C08F0114-00 [ICS,7,C*]; C08J0009-06 [ICS,7]; C08J0009-00 [ICS,7,C*]
	IPCR	C08J0009-00 [I,C*]; C08J0009-14 [I,A]
CN 1318459	IPCI	B29C0044-00 [ICM,7]; C08L0027-06 [ICS,7]; C08L0027-00 [ICS,7,C*]; C08K0005-02 [ICS,7]; C08K0005-00 [ICS,7,C*]
	IPCR	C08J0009-00 [I,C*]; C08J0009-14 [I,A]
JP 2001302836	IPCI	C08J0009-14 [ICM,7]; C08J0009-00 [ICM,7,C*]; C08L0027-06 [ICS,7]; C08L0027-00 [ICS,7,C*]

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                 IPCR   C08J0009-00 [I,C*]; C08J0009-14 [I,A]
 MX 2001PA03927  IPCI   C08J0009-14 [ICM,5]; C08J0009-00 [ICM,5,C*]
AB   PVC foam blown with a phys. blowing agent comprising a gaseous
     HFC is provided.
ST   pvc foam HFC blowing agent
IT   Hydrocarbons, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (fluoro, blowing agents; preparation of PVC foams using gaseous
        HFC)
IT   Blowing agents
        (preparation of PVC foams using gaseous HFC)
IT   75-10-5, HFC 32   75-37-6, HFC 152a 354-33-6, HFC 125
     359-35-3, HFC 134 420-46-2, HFC 143a   460-73-1, HFC 245fa
     811-97-2, HFC 134a
     RL: MOA (Modifier or additive use); USES (Uses)
        (blowing agent; preparation of PVC foams using gaseous HFC)
IT   9002-86-2, PVC
     RL: TEM (Technical or engineered material use); USES (Uses)
        (foam; preparation of PVC foams using gaseous HFC)
RE.CNT  5     THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; JP 03273035 A2 1991 CAPLUS
(2) Brandt; US 5710189 1998 CAPLUS
(3) Dey, S; the J of Vinyl & Additive Technology 1996, V2(1) CAPLUS
(4) Eguchi; US 4456572 1984
(5) Robin; US 5278196 1994 CAPLUS

L15  ANSWER 56 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2001:301141  CAPLUS
DN   134:312887
ED   Entered STN:  29 Apr 2001
TI   Wet compression versus dry compression in refrigeration cycles
     working with pure refrigerants or non-azeotropic mixtures for spatial air
     conditioning applications
AU   Swanepoel, W.; Meyer, J. P.
CS   Research Group for Cooling and Heating Technology, Department of
     Mechanical and Manufacturing Engineering, Laboratory for Energy, Rand
     Afrikaans University, Auckland Park, 2006, S. Afr.
SO   Thermodynamics, Heat and Mass Transfer of Refrigeration Machines and Heat
     Pumps, Seminar Eurotherm, 59th, Nancy, France, July 6-7, 1998 (1998),
     409-415.  Editor(s): Auracher, H.; Feidt, M.; Tsatsaronis, G. Publisher:
     Laboratoire d'Energetique et de Mecanique Theorique et Appliquee,
     Vandoeuvre, Fr.
     CODEN: 69BFFS
DT   Conference
LA   French
CC   47-4 (Apparatus and Plant Equipment)
AB   The search for a more efficient, cheaper and safer refrigerant is a never
     ending one.  The reason for this statement is partly due to the fact that
     research revealed that, not only the pure refrigerants, but mixts. of
     refrigerants can reveal some interesting results as well.  It is therefore
     the purpose of this paper to compare wet compression with dry compression
     by means of comparing the coefficient of performances of most of the well known
     pure refrigerants and non-azeotropic mixts. at various mixture concns.
ST   refrigerant air conditioning wet dry compression comparison;
     refrigeration cycle wet dry compression refrigeration
     comparison
IT   Air conditioning
     Compression
     Refrigerants
        (comparison of wet and dry compression of pure refrigerants or
        non-azeotropic mixts. for spatial air conditioning applications)
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IT 75-10-5, R32, Refrigerant 75-45-6 75-68-3, R142b 75-71-8,
R12, Refrigerant 76-19-7, R218 354-33-6, R125 420-46-2
, R143a 430-66-0, R143 811-97-2, R134a 2837-89-0, R124
7664-41-7, Ammonia, uses
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(comparison of wet and dry compression of pure refrigerants or non-azeotropic mixts. for spatial air conditioning applications)

RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Cavallini, A; International Journal of Refrigeration 1996, V19(8), P485
(2) Domanski, P; ASHRAE Technical Data Bulletin 1993, V9(4), P21
(3) Gallagher, J; Thermodynamic Properties of Refrigerants and Refrigerant Mixtures Database REFPROP 1993, P1
(4) Itard, L; International Journal of Refrigeration 1995, V18(7), P495 CAPLUS
(5) Kondepudi, S; ASHRAE Technical Data Bulletin 1993, V9(4), P40
(6) Linton, J; ASHRAE Technical Data Bulletin 1993, V9(4), P55
(7) Lorentzen, G; International Journal of Refrigeration 1995, V18(3), P190 CAPLUS
(8) Radermacher, R; ASHRAE Technical Data Bulletin 1993, V9(4), P1
(9) Rane, M; International Journal of Refrigeration 1993, V16(4), P258 CAPLUS
(10) Richardson, R; International Journal of Refrigeration 1995, V18(1), P58 CAPLUS
(11) Sand, J; ASHRAE Technical Data Bulletin 1993, V9(4), P12
(12) Sanvordenker, K; ASHRAE Technical Data Bulletin 1993, V9(4), P34
(13) Spatz, M; ASHRAE Technical Data Bulletin 1993, V9(4), P48
(14) Stoecker, W; Refrigeration and Air Conditioning 1982, P193

L15 ANSWER 57 OF 175 CAPLUS
AN 2001:185836 CAPLUS
DN 134:223769
ED Entered STN: 16 Mar 2001
TI Insulating extruded foams having monovinyl aromatic polymers with a broad molecular weight distribution and their manufacture
IN Duffy, John D.; Vo, Chau V.; Mason, Jeffrey J.; Paquet, Andrew N.
PA Dow Chemical Co., USA
SO PCT Int. Appl., 20 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C08J009-14
ICS C08J009-00
CC 38-3 (Plastics Fabrication and Uses)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001018098	A1	20010315	WO 2000-US24115	20000901
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, YU, ZA, ZW				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	CA 2381559	A1	20010315	CA 2000-2381559	20000901
	EP 1214372	A1	20020619	EP 2000-957943	20000901
	EP 1214372	B1	20051228		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL				
	TR 200200531	T2	20020621	TR 2002-531	20000901
	HU 2002002699	A2	20021228	HU 2002-2699	20000901

	HU 2002002699	A3	20031128		
	JP 2003508613	T	20030304	JP 2001-522316	20000901
	RU 2247756	C2	20050310	RU 2002-108348	20000901
	AT 314415	T	20060115	AT 2000-957943	20000901
	ES 2250180	T3	20060416	ES 2000-957943	20000901
	NO 2002001038	A	20020430	NO 2002-1038	20020301
	MX 2002PA02323	A	20020812	MX 2002-PA2323	20020301
PRAI	US 1999-152530P	P	19990903		
	US 1999-152845P	P	19990908		
	US 1999-153320P	P	19990910		
	WO 2000-US24115	W	20000901		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2001018098	ICM	C08J009-14
	ICS	C08J009-00
	IPCI	C08J0009-14 [ICM,7]; C08J0009-00 [ICS,7]
	IPCR	B29C0047-00 [I,C*]; B29C0047-00 [I,A]; B29K0025-00 [N,A]; B29K0105-04 [N,A]; C08J0009-00 [I,C*]; C08J0009-12 [I,A]; C08J0009-14 [I,A]
	ECLA	C08J009/12F+L25/06; C08J009/14P+L25/06
CA 2381559	IPCI	C08J0009-14 [ICM,7]; C08J0009-00 [ICS,7]
	IPCR	B29C0047-00 [I,C*]; B29C0047-00 [I,A]; B29K0025-00 [N,A]; B29K0105-04 [N,A]; C08J0009-00 [I,C*]; C08J0009-12 [I,A]; C08J0009-14 [I,A]
	ECLA	C08J009/12F+L25/06; C08J009/14P+L25/06
EP 1214372	IPCI	C08J0009-14 [ICM,7]; C08J0009-00 [ICS,7]
	IPCR	B29C0047-00 [I,C*]; B29C0047-00 [I,A]; B29K0025-00 [N,A]; B29K0105-04 [N,A]; C08J0009-00 [I,C*]; C08J0009-12 [I,A]; C08J0009-14 [I,A]
	ECLA	C08J009/12F+L25/06; C08J009/14P+L25/06
TR 200200531	IPCI	C08J0009-14 [ICM,7]; C08J0009-00 [ICS,7]
	IPCR	B29C0047-00 [I,C*]; B29C0047-00 [I,A]; B29K0025-00 [N,A]; B29K0105-04 [N,A]; C08J0009-00 [I,C*]; C08J0009-12 [I,A]; C08J0009-14 [I,A]
	ECLA	C08J009/12F+L25/06; C08J009/14P+L25/06
HU 2002002699	IPCI	C08J0009-14 [ICM,7]; C08J0009-00 [ICM,7,C*]
	IPCR	B29C0047-00 [I,C*]; B29C0047-00 [I,A]; B29K0025-00 [N,A]; B29K0105-04 [N,A]; C08J0009-00 [I,C*]; C08J0009-12 [I,A]; C08J0009-14 [I,A]
	ECLA	C08J009/12F+L25/06; C08J009/14P+L25/06
JP 2003508613	IPCI	C08J0009-12 [ICM,7]; C08J0009-00 [ICM,7,C*]; B29C0047-00 [ICS,7]; B29K0025-00 [ICS,7]; B29K0105-04 [ICS,7]; C08L0025-06 [ICS,7]; C08L0025-00 [ICS,7,C*]
	IPCR	B29C0047-00 [I,C*]; B29C0047-00 [I,A]; B29K0025-00 [N,A]; B29K0105-04 [N,A]; C08J0009-00 [I,C*]; C08J0009-12 [I,A]; C08J0009-14 [I,A]
RU 2247756	IPCI	C08J0009-14 [ICM,7]; C08J0009-00 [ICM,7,C*]
	IPCR	C08J0009-00 [I,C*]; C08J0009-14 [I,A]
AT 314415	IPCI	C08J0009-14 [ICS,7]; C08J0009-00 [ICS,7]
	IPCR	C08J0009-00 [I,C*]; C08J0009-12 [I,A]; C08J0009-14 [I,A]
	ECLA	C08J009/12F+L25/06; C08J009/14P+L25/06
ES 2250180	IPCI	C08J0009-14 [ICS,4]; C08J0009-00 [ICS,4]
	IPCR	B29C0047-00 [I,C*]; B29C0047-00 [I,A]; B29K0025-00 [N,A]; B29K0105-04 [N,A]; C08J0009-00 [I,C*]; C08J0009-12 [I,A]; C08J0009-14 [I,A]
	ECLA	C08J009/12F+L25/06; C08J009/14P+L25/06
NO 2002001038	IPCI	C08J0009-14 [ICM,7]; C08J0009-00 [ICS,7]
	IPCR	B29C0047-00 [I,C*]; B29C0047-00 [I,A]; B29K0025-00 [N,A]; B29K0105-04 [N,A]; C08J0009-00 [I,C*]; C08J0009-12 [I,A]; C08J0009-14 [I,A]

ECLA C08J009/12F+L25/06; C08J009/14P+L25/06
MX 2002PA02323 IPCI C08J0009-00 [ICM,5]; C08J0009-14 [ICS,5]

AB Title closed-cell foams show a thermal conductivity (TC; based on EN-13164) of ≤35 mW/m-°K. and comprise (a) polymers containing ≥50% monovinyl aromatic monomers and having an weight-average mol. weight of (Mw) 130,000-400,000 and polydispersity (Mw/Mn) of ≥2.5 and (b) blowing agent residues from mixts. of 30-90% fluoro hydrocarbons as primary blowing agents (optionally and 0-50% CO_2) and 10-70% secondary blowing agents selected from C1-4 alcs., C1-5 linear or cyclic hydrocarbons, alkyl halides, and water. A polystyrene with Mw of 150,000 and Mw/Mn of 3.29 was extruded along with 10 phr blowing agent (6.9:0.6:2.5 HFC 134A, CO_2, and EtOH) gave a foam with d. 37.8 kg/m3, cell size 0.21 mm, open cell content 1.8%, and TC 28.6 mW/m-°K.

ST thermal insulator foam styrene polymer broad mol wt distribution; blowing agent blend manuf styrene resin foam thermal insulator

IT Alcohols, uses
RL: MOA (Modifier or additive use); USES (Uses)
(C1-4; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT Hydrocarbons, uses
RL: MOA (Modifier or additive use); USES (Uses)
(C1-5; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT Carbon black, uses
RL: MOA (Modifier or additive use); USES (Uses)
(IR attenuator; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT Hydrocarbons, uses
RL: MOA (Modifier or additive use); USES (Uses)
(fluoro; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT Blowing agents
Polydispersity
Thermal insulators
(high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT Alkyl halides
RL: MOA (Modifier or additive use); USES (Uses)
(high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT Vinyl compounds, uses
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(polymers, aromatic; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT 7782-42-5, Graphite, uses 13463-67-7, Titania, uses
RL: MOA (Modifier or additive use); USES (Uses)
(IR attenuator; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT 7429-90-5, Aluminum, uses
RL: MOA (Modifier or additive use); USES (Uses)
(flake, IR attenuator; high-polydispersity styrene resin-based extruded thermal insulator foams prepared from mixed blowing agents)

IT 64-17-5, Ethanol, uses 67-56-1, Methanol, uses 67-63-0, Isopropanol, uses 71-23-8, n-Propanol, uses 74-82-8, Methane, uses 74-84-0, Ethane, uses 74-98-6, Propane, uses 75-10-5, HFC 32 75-28-5, Isobutane 75-37-6, HFC 152A 75-73-0, Perfluoromethane 76-16-4, Perfluoroethane 76-19-7, Perfluoropropane 78-78-4, Isopentane 106-97-8, n-Butane, uses 109-66-0, n-Pentane, uses 115-25-3, Perfluorocyclobutane 124-38-9, Carbon dioxide, uses 287-23-0,

Cyclobutane 287-92-3, Cyclopentane 353-36-6, HFC 161 354-33-6
, HFC 125 355-25-9, Perfluorobutane 359-35-3, HFC 134 406-58-6, HFC
365mfc 420-46-2, HFC 143A 421-07-8, HFC 263fb 430-61-5, HFC
272fb 431-89-0, HFC227ea 460-73-1, HFC 245fa 463-82-1, Neopentane
593-53-3, Methyl fluoride 811-97-2, HFC 134A 2252-84-8,
Heptafluoropropane 7732-18-5, Water, uses
RL: MOA (Modifier or additive use); USES (Uses)
(high-polydispersity styrene resin-based extruded thermal insulator
foams prepared from mixed blowing agents)

IT 9003-53-6, Polystyrene
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM
(Technical or engineered material use); PROC (Process); USES (Uses)
(high-polydispersity styrene resin-based extruded thermal insulator
foams prepared from mixed blowing agents)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Basf Ag; EP 0361096 A 1990 CAPLUS
(2) Basf Ag; EP 0543242 A 1993 CAPLUS
(3) Leduc, E; US 5149473 A 1992 CAPLUS
(4) Vo, C; US 5650106 A 1997 CAPLUS
(5) Voelker, H; US 5182308 A 1993 CAPLUS

AN 2000:888804 CAPLUS
DN 134:182522
ED Entered STN: 19 Dec 2000
TI Halocarbon greenhouse gas emissions during the next century
AU McCulloch, Archie
CS ICI Chemicals & Polymers Ltd., Runcorn, UK
SO Non-CO2 Greenhouse Gases: Scientific Understanding, Control and
Implementation, Proceedings ofthe International Symposium, 2nd,
Noordwijkerhout, Netherlands, Sept. 8-10, 1999 (2000), Meeting Date 1999,
223-230. Editor(s): Van Ham, J. Publisher: Kluwer Academic Publishers,
Dordrecht, Neth.
CODEN: 69ASWB
DT Conference
LA English
CC 59-2 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 45, 48

AB As a consequence of the efforts of fluorochem. producers to provide release data to be used in the Advanced Global Atmospheric Gases Experiment, the history of the CFC (chlorofluorocarbon) and HCFC (hydrochlorofluorocarbon) markets is accurately documented, with a numerical record from the beginnings to the present day. This provides a comprehensive databank on the demand for these types of material in all of the societal needs that they filled. Anal. of this, coupled with more recent data from enforcement of the Montreal Protocol, has enabled the underlying global trends in each sector of use to be quantified. Since 1990, the collection of production and sales data has extended to HFCs (hydrofluorocarbons), and the trends evident from these nos. are useful for showing the actual extent to which HFCs have substituted for CFCs since consumption of the latter was phased out under the Montreal Protocol and European Regulations. Furthermore, as was demonstrated in the previous First Symposium, robust scenarios for future use of HFCs can be based on these historic analyses. Up-to-date scenarios for unconstrained HFC use in refrigeration, foam blowing, and aerosol and solvent applications up to the year 2100 are presented. The emissions forecast for the period up to 2012 have insignificantly small radiative forcing relative to the totality of greenhouse gases and, even by 2100, the market-based scenario gives only a low contribution from halocarbons to total predicted radiative forcing.

ST   halocarbon future use emission prediction; air pollution future halocarbon
     prediction
IT   Fire extinguishers
        (Fire extinguishers; prediction of halo hydrocarbon greenhouse gas use
        and emissions during the next century)
IT   Hydrocarbons, occurrence
     RL: POL (Pollutant); TEM (Technical or engineered material use); OCCU
     (Occurrence); USES (Uses)
        (bromo fluoro; prediction of halo hydrocarbon greenhouse gas use and
        emissions during the next century)
IT   Hydrocarbons, occurrence
     RL: POL (Pollutant); TEM (Technical or engineered material use); OCCU
     (Occurrence); USES (Uses)
        (chloro fluoro, hydrogen-containing; prediction of halo hydrocarbon
        greenhouse gas use and emissions during the next century)
IT   Hydrocarbons, occurrence
     RL: POL (Pollutant); TEM (Technical or engineered material use); OCCU
     (Occurrence); USES (Uses)
        (chlorofluorocarbons; prediction of halo hydrocarbon greenhouse gas use
        and emissions during the next century)
IT   Hydrocarbons, occurrence
     RL: POL (Pollutant); TEM (Technical or engineered material use); OCCU
     (Occurrence); USES (Uses)
        (fluoro, hydrogen-containing; prediction of halo hydrocarbon greenhouse gas
        use and emissions during the next century)
IT   Climate
        (greenhouse effect; prediction of halo hydrocarbon greenhouse gas use
        and emissions during the next century)
IT   Blowing agents
     Propellants (sprays and foams)
     Refrigerants
     Solvents
        (halo hydrocarbons; prediction of halo hydrocarbon greenhouse gas use
        and emissions during the next century)
IT   Hydrocarbons, occurrence
     RL: POL (Pollutant); TEM (Technical or engineered material use); OCCU
     (Occurrence); USES (Uses)
        (halo; prediction of halo hydrocarbon greenhouse gas use and emissions
        during the next century)
IT   Air pollution
     Atmospheric aerosols
     Greenhouse gases
        (prediction of halo hydrocarbon greenhouse gas use and emissions during
        the next century)
IT   39432-81-0
     RL: POL (Pollutant); OCCU (Occurrence)
        (prediction of halo hydrocarbon greenhouse gas use and emissions during
        the next century)
IT   75-10-5, Methane, difluoro-   75-37-6, Ethane, 1,1-difluoro-
     75-45-6, Methane, chlorodifluoro-   75-46-7, Methane, trifluoro-
     75-68-3, Ethane, 1-chloro-1,1-difluoro-   75-69-4, Methane,
     trichlorofluoro-   75-71-8, Methane, dichlorodifluoro-   76-13-1, Ethane,
     1,1,2-trichloro-1,2,2-trifluoro-   306-83-2, Ethane, 2,2-dichloro-1,1,1-
     trifluoro- 354-33-6, Ethane, pentafluoro- 420-46-2,
     Ethane, 1,1,1-trifluoro-   431-89-0, Propane, 1,1,1,2,3,3,3-heptafluoro-
     811-97-2, Ethane, 1,1,1,2-tetrafluoro-   1717-00-6, Ethane,
     1,1-dichloro-1-fluoro-   2252-84-8, Propane, 1,1,1,2,2,3,3-heptafluoro-
     2837-89-0, Ethane, 2-chloro-1,1,1,2-tetrafluoro-
     RL: POL (Pollutant); TEM (Technical or engineered material use); OCCU
     (Occurrence); USES (Uses)
        (prediction of halo hydrocarbon greenhouse gas use and emissions during
        the next century)

RE.CNT 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Anon; AFEAS (Alternative Fluorocarbons Environmental Acceptability Study), Production, Sales and Atmospheric Release of Fluorocarbons through 1996 1999

(2) Anon; http://sres.ciesin.org 1999

(3) Calandra, A; Light Metals 1982, P345 CAPLUS

(4) Engen, M; J Geophys Res 1998, V103, P25289

(5) Gamlen, P; Atmos Environ 1986, V20, P1077 CAPLUS

(6) Harnisch, J; Geophys Res Lett 1996, V23(10), P1099

(7) Harnisch, J; Geophys Res Lett 1998, V25, P2401 CAPLUS

(8) Harnisch, J; Geophys Res Lett 1999, V26, P295 CAPLUS

(9) McCarthy, R; Proceedings of 2nd International Conference on the Global Business Outlook for CFC Alternatives 1993

(10) McCulloch, A; Atmos Environ 1992, V26A(7), P1325 CAPLUS

(11) McCulloch, A; Atmos Environ 1998, V32(9), P1571

(12) McCulloch, A; Environment International 1995, V21(4), P353 CAPLUS

(13) McCulloch, A; Environmental Monitoring and Assessment 1994, V31, P167 CAPLUS

(14) McCulloch, A; Proc "Natural Working Fluids" Conference 1998

(15) McFarland, M; Joint IPCC/TEAP Expert Meeting on Options for the Limitation of Emissions of HFCs and PFCs 1999

(16) McFarland, M; Photochemistry Photobiology 1992, V55, P911 CAPLUS

(17) Midgley, P; Atmos Environ 1993, V27A(14), P2215 CAPLUS

(18) Midgley, P; Atmos Environ 1995, V29(14), P1601 CAPLUS

(19) Oram, D; Geophys Res Lett 1996, V23(15), P1949 CAPLUS

(20) Oram, D; Geophys Res Lett 1998, V25(1), P35 CAPLUS

(21) Straume, A; Atmos Environ 1998, V32(24), P4109 CAPLUS

(22) UNEP (United Nations Environment Programme); Issues before the Open-Ended Working Group in its Fifteenth Meeting 1997, document No UNEP/OzL.Pro/WG.1/15/2/Add.7

(23) Wigley, T; STUGE (an Interactive Greenhouse Model): User's Manual 1991

L15 ANSWER 59 OF 175 CAPLUS

AN 2000:881259 CAPLUS

DN 134:43814

ED Entered STN: 15 Dec 2000

TI Method of improving performance of refrigerant systems

IN Schnur, Nicholas E.; Beimesch, Bruce J.

PA Cognis Corporation, USA

SO PCT Int. Appl., 39 pp.
CODEN: PIXXD2

DT Patent

LA English

IC ICM C09K005-04

CC 47-4 (Apparatus and Plant Equipment)
Section cross-reference(s): 48

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2000075258	A1	20001214	WO 2000-US15756	20000608

W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	US 20010019120	A1	20010906	US 1999-328858	19990609
	CA 2375742	A1	20001214	CA 2000-2375742	20000608
	CA 2375742	C	20080318		

```
     BR 2000011375        A     20020305    BR 2000-11375          20000608
     TR 200103544         T2    20020422    TR 2001-3544           20000608
     EP 1198535           A1    20020424    EP 2000-938224         20000608
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, LT, LV, FI, RO, MK, CY, AL
     SI 20748             A     20020630    SI 2000-20027          20000608
     JP 2003501614        T     20030114    JP 2001-502529         20000608
     NZ 515610            A     20040130    NZ 2000-515610         20000608
     MX 2001PA12160       A     20020730    MX 2001-PA12160        20011127
     US 20030047707       A1    20030313    US 2002-151458         20020520
     US 7018558           B2    20060328
PRAI US 1999-328858       A     19990609
     WO 2000-US15756      W     20000608
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 2000075258   ICM    C09K005-04
                 IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
                 IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C09K0005-06 [I,A];
                        C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0171-00
                        [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]
                 ECLA   C09K005/04B4B; C10M105/38; C10M171/00R; M10M; M10M;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10N; M10N; M10N;
                        M10N; M10N; M10N; M10N; M10N; M10N; M10N
 US 20010019120  IPCI   C09K0005-00 [ICM,7]; C10M0101-00 [ICS,7]
                 IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C09K0005-06 [I,A];
                        C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0171-00
                        [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]
                 NCL    252/068.000
                 ECLA   C09K005/04B4B; C10M105/38; C10M171/00R
 CA 2375742      IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,C*]; C10M0105-38
                        [I,A]; C10M0105-00 [I,C*]; C10M0171-00 [I,A]
                 IPCR   C09K0005-00 [I,C]; C09K0005-04 [I,A]; F25B0001-00
                        [I,C*]; F25B0001-00 [I,A]; C09K0005-06 [I,A];
                        C10M0105-00 [I,C]; C10M0105-38 [I,A]; C10M0171-00
                        [I,C]; C10M0171-00 [I,A]; C10N0040-30 [N,A]
 BR 2000011375   IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
                 IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C09K0005-06 [I,A];
                        C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0171-00
                        [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]
 TR 200103544    IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
                 IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C09K0005-06 [I,A];
                        C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0171-00
                        [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]
 EP 1198535      IPCI   C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
                 IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C09K0005-06 [I,A];
                        C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0171-00
                        [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]
                 ECLA   C09K005/04B4B; C10M105/38; C10M171/00R; M10M; M10M;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10N; M10N; M10N;
                        M10N; M10N; M10N; M10N; M10N; M10N; M10N
 SI 20748        IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*];
                        C10M0105-38 [ICS,7]; C10M0105-00 [ICS,7,C*];
                        C10M0171-00 [ICS,7]
                 IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C09K0005-06 [I,A];
                        C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0171-00
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[I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]
JP 2003501614   IPCI   F25B0001-00 [ICM,7]; C09K0005-06 [ICS,7]; C09K0005-00 [ICS,7,C*]; C10M0105-38 [ICS,7]; C10M0105-00 [ICS,7,C*]; C10N0040-30 [ICS,7]
IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C09K0005-06 [I,A]; C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]
NZ 515610   IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C09K0005-06 [I,A]; C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]
MX 2001PA12160   IPCI   C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
US 20030047707   IPCI   C09K0005-04 [I,A]; C09K0005-00 [I,C*]
IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C09K0005-06 [I,A]; C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]
NCL   252/068.000; 062/114.000; 062/084.000; 062/468.000; 508/485.000
ECLA   C09K005/04B4B; C10M105/38; C10M171/00R; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N

AB   A method of improving performance of refrigerant systems such as refrigerators and air conditioners that utilize a refrigerant working fluid. The working fluid consists essentially of a heat transfer fluid and a lubricant that is miscible and is otherwise compatible with the heat transfer fluid at all operating temps. of the refrigerant system. The method is directed particularly to chlorine-free fluoro-group organic fluids and more particularly to hydrofluorocarbon heat transfer fluids. The preferred lubricants comprise polyol ester base-stocks and compounded polyol esters that are highly miscible with such hydrofluorocarbon heat transfer fluids.

ST   refrigerant system heat transfer improvement; cooling air conditioner heat transfer improvement

IT   Cooling apparatus
(air conditioning; method of improving performance of refrigerant systems)

IT   Air conditioners
(cooling apparatus; method of improving performance of refrigerant systems)

IT   Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoro; method of improving performance of refrigerant systems)

IT   Heat transfer
Lubricants
Refrigerants
Refrigerating apparatus
(method of improving performance of refrigerant systems)

IT   Alcohols, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polyhydric, esters; method of improving performance of refrigerant systems)

IT   126-58-9, Dipentaerythritol
RL: TEM (Technical or engineered material use); USES (Uses)
(esters; method of improving performance of refrigerant systems)

IT   75-10-5, Difluoromethane   75-37-6, 1,1-Difluoroethane
109-52-4D, n-Pentanoic acid, esters   115-77-5D, Pentaerythritol, esters
116-53-0D, 2-Methylbutanoic acid, esters   126-30-7D, 2,2-Dimethyl-1,3-propanediol, esters 354-33-6, Pentafluoroethane 420-46-2
, 1,1,1-Trifluoroethane   503-74-2D, 3-Methylbutanoic acid, esters
811-97-2, 1,1,1,2-Tetrafluoroethane   1185-33-7,

2,2-Dimethyl-1-butanol 3302-10-1D, 3,5,5-Trimethylhexanoic acid, ester
RL: TEM (Technical or engineered material use); USES (Uses)
(method of improving performance of refrigerant systems)

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Bunemann; US 5211884 A 1993 CAPLUS
(2) Fukuda; US 5185092 A 1993 CAPLUS
(3) Schnur; US 5906769 A 1999 CAPLUS
(4) Zehler; US 5021179 A 1991 CAPLUS

L15 ANSWER 60 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2000:858927 CAPLUS
DN 134:6374
ED Entered STN: 08 Dec 2000
TI Surface tension correlations for HFCs and HCFCs
AU Duan, Yuanyuan; Zhang, Chonghua; Shi, Lin; Zhu, Mingshan; Han, Lizhong
CS Dep. Thermal Engineering, Tsinghua Univ., Beijing, 100084, Peop. Rep. China
SO Qinghua Daxue Xuebao, Ziran Kexueban (2000), 40(10), 80-83
CODEN: QDXKE8; ISSN: 1000-0054
PB Qinghua Daxue Chubanshe
DT Journal
LA Chinese
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 69
AB Surface tension is a basic thermophys. property which affects the heat transfer and fluid bubbles attached to the surface. Surface tension data for HFCs and HCFCs, which are considered as refrigerant alternatives, is necessary for proper design of air conditioners and refrigeration equipment. The presently available exptl. data was used to develop correlations for the surface tension of HFCs and HCFCs. The correlations are compared with ones in the literature. These correlations accurately represent the exptl. data over a wide temperature range with accuracy that can satisfy the requirements of engineering applications.
ST hydrofluorocarbon refrigerant surface tension correlation; hydrochlorofluorobaron refrigerant surface tension correlation
IT Refrigerants
Surface tension
(surface tension correlations for hydrofluorocarbon and hydrochlorofluorobaron refrigerants)
IT 75-10-5, Hfc-32 75-37-6, Hfc-152a 75-45-6, Hcfc-22 75-68-3, Hcfc-142b 75-88-7, Hcfc-133a 306-83-2, Hcfc-123 354-23-4, Hcfc-123a 354-33-6, Hfc-125 359-35-3, Hfc-134 420-46-2, Hfc-143a 422-56-0, Hcfc-225ca 431-63-0, Hfc-236ea 460-73-1, Hfc-245fa 507-55-1, Hcfc-225cb 679-86-7, Hfc-245ca 690-39-1, Hfc-236fa 811-97-2, Hfc-134a 1717-00-6, Hcfc-141b 2837-89-0, Hcfc-124
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(surface tension correlations for hydrofluorocarbon and hydrochlorofluorobaron refrigerants)

L15 ANSWER 61 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2000:493617 CAPLUS
DN 133:91374
ED Entered STN: 21 Jul 2000
TI Halogenated hydrocarbon refrigerant compositions containing hydrocarbon oil-return agents
IN Bivens, Donald Bernard; Minor, Barbara Haviland; Yokozeki, Akimichi; Spauschus, Hans O.
PA E. I. Du Pont de Nemours & Co., USA
SO PCT Int. Appl., 23 pp.
CODEN: PIXXD2

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DT   Patent
LA   English
IC   ICM  C09K005-04
     ICS  C10M127-02; C10N040-30
CC   48-5 (Unit Operations and Processes)
FAN.CNT 2
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
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PI   WO 2000042118        A1    20000720    WO 1999-US15935        19990714
         W:  AE, AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GD, GE, HR, HU,
             ID, IL, IN, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX,
             NO, NZ, PL, RO, SG, SI, SK, SL, TR, TT, UA, UZ, VN, YU, ZA, AM,
             AZ, BY, KG, KZ, MD, RU, TJ, TM
         RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK,
             ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG,
             CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG
     US 6299792           B1    20011009    US 1999-231847         19990115
     CA 2359090           A1    20000720    CA 1999-2359090        19990714
     AU 9949942           A     20000801    AU 1999-49942          19990714
     AU 772143            B2    20040408
     EP 1151054           A1    20011107    EP 1999-934019         19990714
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, LT, LV, FI, RO
     BR 9917321           A     20020423    BR 1999-17321          19990714
     JP 2002534578        T     20021015    JP 2000-593677         19990714
     ZA 2001004870        A     20020614    ZA 2001-4870           20010614
     MX 2001PA07102       A     20011203    MX 2001-PA7102         20010712
PRAI US 1999-231847       A     19990115
     US 1999-351710       A     19990712
     US 1998-71652P       P     19980116
     WO 1999-US15935      W     19990714
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 2000042118   ICM    C09K005-04
                 ICS    C10M127-02; C10N040-30
                 IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*];
                        C10M0127-02 [ICS,7]; C10M0127-00 [ICS,7,C*];
                        C10N0040-30 [ICS,7]
                 IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*];
                        C10M0101-02 [I,A]; C10M0105-00 [I,C*]; C10M0105-04
                        [I,A]; C10M0105-06 [I,A]; C10M0107-00 [I,C*];
                        C10M0107-02 [I,A]; C10M0121-00 [I,C*]; C10M0121-02
                        [I,A]; C10M0127-00 [I,C*]; C10M0127-02 [I,A];
                        C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10N0040-30
                        [N,A]
                 ECLA   C09K005/04B4B
 US 6299792      IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0171-00
                        [I,C*]; C10M0171-00 [I,A]
                 NCL    252/068.000; 252/067.000
                 ECLA   C09K005/04B4B; C10M171/00R; M10M; M10M; M10M; M10M;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10N; M10N; M10N;
                        M10N; M10N; M10N; M10N; M10N; M10N; M10N
 CA 2359090      IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*];
                        C10M0127-02 [ICS,7]; C10M0127-00 [ICS,7,C*]
                 IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*];
                        C10M0101-02 [I,A]; C10M0105-00 [I,C*]; C10M0105-04
                        [I,A]; C10M0105-06 [I,A]; C10M0107-00 [I,C*];
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C10M0107-02 [I,A]; C10M0121-00 [I,C*]; C10M0121-02 [I,A]; C10M0127-00 [I,C*]; C10M0127-02 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10N0040-30 [N,A]

AU 9949942	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]; C10M0127-02 [ICS,7]; C10M0127-00 [ICS,7,C*]
	IPCR	F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*]; C10M0101-02 [I,A]; C10M0105-00 [I,C*]; C10M0105-04 [I,A]; C10M0105-06 [I,A]; C10M0107-00 [I,C*]; C10M0107-02 [I,A]; C10M0121-00 [I,C*]; C10M0121-02 [I,A]; C10M0127-00 [I,C*]; C10M0127-02 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10N0040-30 [N,A]
EP 1151054	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C10M0127-02 [ICS,6]; C10M0127-00 [ICS,6,C*]; C10N0040-30 [ICS,6]
	IPCR	F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*]; C10M0101-02 [I,A]; C10M0105-00 [I,C*]; C10M0105-04 [I,A]; C10M0105-06 [I,A]; C10M0107-00 [I,C*]; C10M0107-02 [I,A]; C10M0121-00 [I,C*]; C10M0121-02 [I,A]; C10M0127-00 [I,C*]; C10M0127-02 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10N0040-30 [N,A]
BR 9917321	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]; C10M0127-02 [ICS,7]; C10M0127-00 [ICS,7,C*]; C10N0040-30 [ICS,7]
	IPCR	F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*]; C10M0101-02 [I,A]; C10M0105-00 [I,C*]; C10M0105-04 [I,A]; C10M0105-06 [I,A]; C10M0107-00 [I,C*]; C10M0107-02 [I,A]; C10M0121-00 [I,C*]; C10M0121-02 [I,A]; C10M0127-00 [I,C*]; C10M0127-02 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10N0040-30 [N,A]
JP 2002534578	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]; C10M0101-02 [ICS,7]; C10M0101-00 [ICS,7,C*]; C10M0105-04 [ICS,7]; C10M0105-06 [ICS,7]; C10M0105-00 [ICS,7,C*]; C10M0107-02 [ICS,7]; C10M0107-00 [ICS,7,C*]; C10M0121-02 [ICS,7]; C10M0121-00 [ICS,7,C*]; C10M0127-02 [ICS,7]; C10M0127-00 [ICS,7,C*]; C10M0169-04 [ICS,7]; C10M0169-00 [ICS,7,C*]; F25B0001-00 [ICS,7]; C10N0040-30 [ICS,7]
	IPCR	F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*]; C10M0101-02 [I,A]; C10M0105-00 [I,C*]; C10M0105-04 [I,A]; C10M0105-06 [I,A]; C10M0107-00 [I,C*]; C10M0107-02 [I,A]; C10M0121-00 [I,C*]; C10M0121-02 [I,A]; C10M0127-00 [I,C*]; C10M0127-02 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10N0040-30 [N,A]
ZA 2001004870	IPCI	C09K [ICM,7]; C10M [ICS,7]; C10N [ICS,7]
MX 2001PA07102	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]; C10M0127-02 [ICS,5]; C10M0127-00 [ICS,5,C*]; C10N0040-30 [ICS,5]

AB Refrigerant compns. containing hydrocarbon oil-return agents which solubilize mineral and synthetic oil lubricants with hydrofluorocarbon and hydrofluorocarbon/hydrochlorofluorocarbon-based refrigerants are disclosed. These hydrocarbon oil-return agents, having seven through sixteen carbon atoms, as a small proportion of an overall refrigerant composition, permit efficient return of mineral and synthetic oil lubricants

from non-compressor zones back to a compressor zone in a
refrigeration system operating with hydrofluorocarbon and
hydrofluorocarbon/hydrochlorofluorocarbon-based refrigerants.

ST halogenated hydrocarbon refrigerant oil return agent

IT Isoalkanes
RL: MOA (Modifier or additive use); USES (Uses)
(C9-12, oil-return-agent; halogenated hydrocarbon refrigerant compns. containing hydrocarbon oil-return agents)

IT Hydrocarbons, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(chlorofluorocarbons; halogenated hydrocarbon refrigerant compns. containing hydrocarbon oil-return agents)

IT Hydrocarbons, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(fluoro, refrigerants containing; halogenated hydrocarbon refrigerant compns. containing hydrocarbon oil-return agents)

IT Hydrocarbons, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(halo; halogenated hydrocarbon refrigerant compns. containing hydrocarbon oil-return agents)

IT Lubricants
Refrigerants
(halogenated hydrocarbon refrigerant compns. containing hydrocarbon oil-return agents)

IT Hydrocarbon oils
Hydrocarbons, uses
Naphthenes
Naphthenic oils
Paraffin oils
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(halogenated hydrocarbon refrigerant compns. containing hydrocarbon oil-return agents)

IT 662-35-1, Butane, 1,1,1,2,2,3,3,4-octafluoro- 2924-29-0, Butane, 1,1,1,2,2,4,4,4-octafluoro- 35230-11-6, Butane, 1,1,1,2,3,3,4,4-octafluoro- 119450-58-7, Butane, 1,1,1,2,2,3,4,4-octafluoro-
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(halogenated hydrocarbon refrigerant compns. containing hydrocarbon oil-return agents)

IT 125624-30-8, Zerol 150 231289-57-9, HAB 22
RL: DEV (Device component use); NUU (Other use, unclassified); USES (Uses)
(oil containing; halogenated hydrocarbon refrigerant compns. containing hydrocarbon oil-return agents)

IT 75-10-5, HFC-32 75-37-6, HFC-152a 75-43-4, HCFC-21 75-45-6, HCFC-22 75-46-7, HFC-23 75-68-3, HCFC-142b 75-71-8, CFC-12 75-88-7, HCFC-133a 76-16-4, Ethane, hexafluoro- 306-83-2, HCFC-123 354-23-4, HCFC-123a 354-25-6, HCFC-124a 354-33-6, HFC-125 355-37-3, Hexane, 1,1,1,2.2.3,3,4,4,5,5,6,6-tridecafluoro- 359-35-3, HFC-134 359-58-0, HCFC-226ea 375-61-1, HFC-42-11p 377-36-6, HFC-338pcc 420-26-8, HFC-281ea 420-45-1, HFC-272ca 420-46-2, HFC-143a 421-48-7, Propane, 1,1,1,2-tetrafluoro- 422-02-6, HCFC-235cb 422-44-6, Propane, 1,2-dichloro-1,1,2,3,3-pentafluoro- 422-48-0, Propane, 2,3-dichloro-1,1,1,2,3-pentafluoro- 422-55-9, HCFC-226cb 422-56-0, HCFC-225ca 422-57-1, HCFC-226ca 430-61-5, HFC-272fb 430-66-0, HFC-143 431-31-2, HFC-245eb 431-63-0, HFC-236ea 431-86-7, HCFC-225da 431-87-8, HCFC-226da 431-89-0, Propane, 1,1,1,2,3,3,3-heptafluoro 460-13-9, HFC-281fa 460-36-6, Propane, 1,1,1,3-tetrafluoro- 460-73-1, HFC-245fa 460-92-4, HCFC-235fa

462-39-5, Propane, 1,3-difluoro-   507-55-1, HCFC-225cb   593-53-3, HFC-41
593-70-4, HCFC-31   677-55-4, HCFC-235cc   677-56-5, HFC-236cb   679-86-7,
HFC-245ca   679-99-2, HCFC-235ca   680-00-2, HFC-236ca   690-39-1,
HFC-236fa   755-23-7, Pentane, 1,1,2,2,3,3,4,4,5,5-decafluoro-   755-45-3,
HFC-43-10mf 811-97-2, HFC-134a   813-75-2, HFC-254ca
1615-75-4, HCFC-151a   1814-88-6, Propane, 1,1,1,2,2-pentafluoro-
2252-84-8, Propane, 1,1,1,2,2,3,3-heptafluoro-   2837-89-0, HCFC-124
13474-88-9, Propane, 1,1-dichloro-1,2,2,3, 3-pentafluoro-   24270-66-4,
HFC-245ea   24270-68-6, Propane, 1,1,2,3-tetrafluoro-   28103-66-4,
Propane, 2-chloro-1,1,1,3,3-pentafluoro-   40723-63-5, Propane,
1,1,2,2-tetrafluoro-   51346-64-6, HCFC-226ba   62126-90-3, HFC-272ea
66794-30-7, Propane, 1,1,3,3-tetrafluoro-   75995-72-1, Butane,
1,1,1,2,3,4,4,4-octafluoro-   95576-21-9, HFC-43-10mcf   95576-22-0,
Pentane, 1,1,1,2,2,3,4,4,5,5,5-undecafluoro-   111512-56-2, Propane,
1,1-dichloro-1,2,3,3,3-pentafluoro-   128903-21-9, Propane,
2,2-dichloro-1,1,1,3,3-pentafluoro-   134251-06-2, Propane,
3-chloro-1,1,1,2,3-pentafluoro-   136013-79-1, Propane,
1,3-dichloro-1,1,2,3,3-pentafluoro-   136640-02-3, Pentane,
1,1,1,2,3,3,4,4,5,5-decafluoro-   138495-42-8, HFC-43-10mee   144429-90-3,
Propane, 2-chloro-1,1,2,3,3-pentafluoro-   150999-42-1, Pentane,
1,1,1,2,2,3,3,4,5,5-decafluoro-   151868-60-9, Pentane,
1,1,1,2,3,3,4,5,5,5-decafluoro-   162102-07-0, Propane,
1-chloro-1,1,2,3,3-pentafluoro-   170444-79-8, Pentane,
1,1,1,2,2,3,3.4,4,5-decafluoro-   188190-55-8, Pentane,
1,1,1,2,2,3,4,4,5,5-decafluoro-   230956-35-1, Propane,
2-chloro-1,1,1,2,3-pentafluoro-
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(refrigerant containing; halogenated hydrocarbon refrigerant compns. containing
hydrocarbon oil-return agents)

IT   146732-63-0, R 401A   150743-07-0, R 404A   158675-78-6, R 407C
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(refrigerant; halogenated hydrocarbon refrigerant compns. containing hydrocarbon oil-return agents)

RE.CNT 6   THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Du Pont; EP 0421586 A 1991 CAPLUS
(2) Du Pont; WO 9418282 A 1994 CAPLUS
(3) Idemitsu Kosan Co; EP 0369320 A 1990 CAPLUS
(4) Minnesota Mining & Mfg; WO 9636688 A 1996 CAPLUS
(5) Muntz, P; WO 9315168 A 1993 CAPLUS
(6) Nimitz, J; US 5716549 A 1998 CAPLUS

AN   2000:416601 CAPLUS
DN   133:19307
ED   Entered STN: 22 Jun 2000
TI   Performances of ternary refrigerant mixtures in air-conditioning cycle as substitutes of HCFC22
AU   Wang, Huaixin; Sun, Junying; Li, Li; Lu, Canren
CS   School of Electrical Automation and Energy Engineering, Tianjin University, Peop. Rep. China
SO   Tianjin Daxue Xuebao, Ziran Kexue Yu Gongcheng Jishuban (1999), 32(5), 535-538
CODEN: TDXZAE
PB   Tianjin Daxue Xuebao Bianjibu
DT   Journal
LA   Chinese
CC   48-5 (Unit Operations and Processes)
Section cross-reference(s): 69

AB Ternary mixts. HFC32/HFC143a/HCF134a and HFC32/HFC125/HCF152a are proposed and discussed as substitutes for HCFC22 in the air-conditioning system. The blends with the recommended compns. have thermodn. properties and theor. refrigeration cycle performances close to that of HCFC22, while HFC32/HFC143a/HCF134a seems more promising with slightly higher COP, sp. volumetric refrigerating capacity and lower discharge temperature than HCFC22.

ST refrigerant ternary mixt air conditioning performance; HCFC22 substitute refrigerant ternary mixt performance; thermodn property ternary mixt refrigerant; HFC32 HFC143a HCF134a refrigerant mixt performance; HFC125 HFC32 HCF152a refrigerant mixt performance

IT Air conditioning
Refrigerants
Ternary mixtures
(performances of ternary refrigerant mixts. in air-conditioning cycle as substitutes of HCFC22)

IT 75-37-6, HFC152a 354-33-6, HFC125
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(performances of HFC32/HFC125/HCF152a ternary refrigerant mixts. in air-conditioning cycle as substitutes of HCFC22)

IT 75-10-5, HFC32 420-46-2, HFC143a 811-97-2, HFC134a
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(performances of HFC32/HFC143a/HCF134a ternary refrigerant mixts. in air-conditioning cycle as substitutes of HCFC22)

IT 75-45-6, HCFC22
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(performances of ternary refrigerant mixts. in air-conditioning cycle as substitutes of HCFC22)

L15 ANSWER 63 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 2000:351736 CAPLUS
DN 132:349419
ED Entered STN: 26 May 2000
TI Heat transfer device
IN Powell, Richard Llewellyn; Corr, Stuart; Murphy, Frederick Thomas; Morrison, James David
PA Imperial Chemical Industries P.L.C., UK
SO PCT Int. Appl., 24 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM F25B045-00
ICS B09B003-00
CC 47-4 (Apparatus and Plant Equipment)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2000029796	A1	20000525	WO 1999-GB3616	19991102

W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

PRAI GB 1998-24798 A 19981112

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CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 2000029796   ICM    F25B045-00
                 ICS    B09B003-00
                 IPCI   F25B0045-00 [ICM,7]; B09B0003-00 [ICS,7]
                 IPCR   F25B0045-00 [I,C*]; F25B0045-00 [I,A]
                 ECLA   F25B045/00
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AB   A heat transfer device comprising a refrigeration circuit containing a refrigerant and a refrigerant recovery system is described. The refrigerant recovery system comprises (A) a holding vessel for containing the refrigerant once the device has reached the end of its operational life and (B) refrigerant transfer means for transferring the refrigerant from the refrigeration circuit to the holding vessel. A method for recovering a refrigerant contained in a refrigeration circuit of a heat transfer device is also described. The method comprises the step of transferring at least a proportion of the total refrigerant charge to a holding vessel fixed to the heat transfer device by means of a refrigerant transfer pipe.

ST   heat transfer device refrigeration app

IT   Heat transfer
     Refrigerants
       Refrigerating apparatus
         (heat transfer device comprising refrigeration circuit containing refrigerant and refrigerant recovery system)

IT   75-10-5   75-37-6 354-33-6   359-35-3 420-46-2
     811-97-2
     RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
         (heat transfer device comprising refrigeration circuit containing refrigerant and refrigerant recovery system)

RE.CNT 9   THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Bayerische Motoren Werke Ag; DE 4207859 A 1993
(2) Bbc York Kaelte Klima; EP 0360113 A 1990
(3) Devault, R; US 4934149 A 1990
(4) Furmanek, D; US 5025633 A 1991
(5) Gramkow, A; US 5097667 A 1992
(6) Hancock, J; US 5186017 A 1993
(7) Margulefsky, A; US 4480446 A 1984
(8) Nelson, J; US 5293756 A 1994
(9) Noble III, J; US 5746259 A 1998

L15 ANSWER 64 OF 175 CAPLUS
AN   2000:238061 CAPLUS
DN   132:280158
ED   Entered STN: 13 Apr 2000
TI   Foams having increased heat distortion temperature from blends of alkenyl aromatic polymers
IN   Chaudhary, Bharat I.; Barry, Russell P.; Cirihal, Stephanie C.
PA   Dow Chemical Co., USA
SO   U.S., 18 pp.
     CODEN: USXXAM
DT   Patent
LA   English
IC   ICM C08J009-00
     ICS B29D067-00; B32B003-26
INCL 521081000
CC   38-3 (Plastics Fabrication and Uses)
     Section cross-reference(s): 35
FAN.CNT 1
     PATENT NO.   KIND   DATE   APPLICATION NO.   DATE

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PI   US 6048909           A     20000411    US 1998-206058         19981204
     CA 2353098           A1    20000615    CA 1999-2353098        19991115
     WO 2000034364        A1    20000615    WO 1999-US27114        19991115
         W:  AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ,
             DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS,
             JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK,
             MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ,
             TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW
         RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE,
             DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF,
             CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG
     EP 1137697           A1    20011004    EP 1999-959001         19991115
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, LT, LV, FI, RO
     TR 200102274         T2    20020221    TR 2001-2274           19991115
     HU 2001004511        A2    20020328    HU 2001-4511           19991115
     JP 2002531657        T     20020924    JP 2000-586805         19991115
     NO 2001002692        A     20010709    NO 2001-2692           20010531
     MX 2001PA05578       A     20000827    MX 2001-PA5578         20010604
PRAI US 1998-206058       A     19981204
     WO 1999-US27114      W     19991115
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 US 6048909      ICM    C08J009-00
                 ICS    B29D067-00; B32B003-26
                 INCL   521081000
                 IPCI   C08J0009-00 [ICM,7]; B29D0067-00 [ICS,7]; B32B0003-26
                        [ICS,7]
                 IPCR   C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-14
                        [I,A]; C08L0023-00 [I,C*]; C08L0023-00 [I,A];
                        C08L0023-08 [N,A]; C08L0025-00 [I,C*]; C08L0025-00
                        [I,A]; C08L0025-06 [I,A]
                 NCL    521/081.000; 264/050.000; 264/051.000; 264/053.000;
                        264/054.000; 264/299.000; 264/331.110; 264/331.130;
                        264/DIG.013; 264/DIG.016; 264/DIG.017; 428/304.400;
                        428/332.000; 428/340.000; 521/059.000; 521/074.000;
                        521/075.000; 521/079.000; 521/099.000; 521/122.000;
                        521/132.000; 521/133.000; 521/134.000; 521/139.000;
                        521/142.000; 521/144.000; 521/150.000; 521/917.000;
                        524/081.000; 524/401.000; 524/442.000; 524/445.000;
                        524/451.000
                 ECLA   C08J009/14+L25/04; C08L025/06+B2
 CA 2353098      IPCI   C08J0009-00 [ICM,7]; C08L0025-00 [ICS,7]; C08L0025-06
                        [ICS,7]; C08L0025-08 [ICS,7]
                 IPCR   C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-14
                        [I,A]; C08L0023-00 [I,C*]; C08L0023-00 [I,A];
                        C08L0023-08 [N,A]; C08L0025-00 [I,C*]; C08L0025-00
                        [I,A]; C08L0025-06 [I,A]
 WO 2000034364   IPCI   C08J0009-00 [ICM,7]; C08L0025-00 [ICS,7]; C08L0025-06
                        [ICS,7]; C08L0025-08 [ICS,7]
                 IPCR   C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-14
                        [I,A]; C08L0023-00 [I,C*]; C08L0023-00 [I,A];
                        C08L0023-08 [N,A]; C08L0025-00 [I,C*]; C08L0025-00
                        [I,A]; C08L0025-06 [I,A]
                 ECLA   C08J009/14+L25/04; C08L025/06+B2; M08L
 EP 1137697      IPCI   C08J0009-00 [ICM,6]; C08L0025-00 [ICS,6]; C08L0025-06
                        [ICS,6]; C08L0025-08 [ICS,6]
                 IPCR   C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-14
                        [I,A]; C08L0023-00 [I,C*]; C08L0023-00 [I,A];
                        C08L0023-08 [N,A]; C08L0025-00 [I,C*]; C08L0025-00
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[I,A]; C08L0025-06 [I,A]
TR 200102274 IPCI C08J0009-00 [ICM,7]; C08L0025-00 [ICS,7]; C08L0025-06 [ICS,7]; C08L0025-08 [ICS,7]
IPCR C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C08L0023-00 [I,C*]; C08L0023-00 [I,A]; C08L0023-08 [N,A]; C08L0025-00 [I,C*]; C08L0025-00 [I,A]; C08L0025-06 [I,A]
HU 2001004511 IPCI C08J0009-00 [ICM,7]
JP 2002531657 IPCI C08J0009-04 [ICM,7]; C08J0009-04 [ICS,7]; C08J0009-00 [ICS,7,C*]; C08L0023-00 [ICS,7]; C08L0025-00 [ICS,7]
IPCR C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C08L0023-00 [I,C*]; C08L0023-00 [I,A]; C08L0023-08 [N,A]; C08L0025-00 [I,C*]; C08L0025-00 [I,A]; C08L0025-06 [I,A]
NO 2001002692 IPCI C08J [ICM,7]
IPCR C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C08L0023-00 [I,C*]; C08L0023-00 [I,A]; C08L0023-08 [N,A]; C08L0025-00 [I,C*]; C08L0025-00 [I,A]; C08L0025-06 [I,A]
MX 2001PA05578 IPCI C08J0009-00 [ICM,5]; C08L0025-00 [ICS,5]; C08L0025-06 [ICS,5]; C08L0025-08 [ICS,5]

AB The present invention pertains to improved alkenyl aromatic polymer foams (and processes for their preparation) having increased heat distortion temperature and improved dimensional stability while maintaining good tensile/tear, creep and environmental dimensional change properties. The closed cell low d. alkenyl aromatic polymer foams exhibit increased heat distortion temperature, when substantially random interpolymers of about 21 to about 65 mol % styrene are blended in. The foams contain alkenyl aromatic polymers and copolymers of vinyl aromatic monomers and/or vinyl (cyclo)aliphatic monomers and α-olefins. When these same alkenyl aromatic polymer foams are made without these interpolymers, the heat distortion temperature is not improved. A blend contained polystyrene and ethylene-styrene copolymer (prepared using (1H-cyclopenta[1]phenanthrene-2-yl)dimethyl(t-butylamido)-silanetitanium 1,4-diphenylbutadiene catalyst).

ST polystyrene ethylene styrene copolymer foam

IT Air
(blowing agent; foams having increased heat distortion temperature from blends of alkenyl aromatic polymers)

IT Plastic foams
RL: TEM (Technical or engineered material use); USES (Uses)
(foams having increased heat distortion temperature from blends of alkenyl aromatic polymers)

IT 64-17-5, Ethanol, uses 67-56-1, Methanol, uses 67-63-0, 2-Propanol, uses 71-23-8, n-Propanol, uses 71-55-6, 1,1,1-Trichloro-ethane 74-82-8, Methane, uses 74-84-0, Ethane, uses 74-87-3, Methyl chloride, uses 74-98-6, Propane, uses 75-00-3, Ethyl chloride 75-09-2, Methylene chloride, uses 75-10-5, HFC-32 75-28-5, Isobutane 75-37-6, HFC-152a 75-45-6, HCFC-22 75-68-3, HCFC-142b 75-69-4, CFC-11 75-71-8, CFC-12 75-73-0, Perfluoromethane 76-13-1, CFC-113 76-14-2, CFC-114 76-16-4, Perfluoroethane 76-19-7, Perfluoropropane 77-92-9, uses 78-67-1, Azodiisobutyro-nitrile 78-78-4, Isopentane 80-17-1 106-97-8, n-Butane, uses 109-66-0, Pentane, uses 115-25-3, Perfluorocyclobutane 123-77-3, Azodicarbonamide 124-38-9, Carbon dioxide, uses 133-55-1, N,N'-Dimethyl-N,N'-dinitrosotere-phthalamide 144-55-8, Sodium bicarbonate, uses 306-83-2, HCFC-123 353-36-6, HFC-161 354-33-6, HFC-125 355-25-9, Perfluorobutane 359-35-3, HFC-134 420-45-1, 2,2-Difluoropropane 420-46-2, HFC-143a 421-07-8, 1,1,1-Trifluoropropane 463-82-1, Neopentane 593-53-3, Methyl fluoride 811-97-2, HFC-134a 1717-00-6,

HCFC-141b   2551-62-4, Sulfur hexafluoride   2837-89-0, HCFC-124
3955-25-7, Barium azodicarboxylate   7440-37-1, Argon, uses   7440-59-7,
Helium, uses   7727-37-9, Nitrogen, uses   7732-18-5, Water, uses
10105-42-7, Trihydrazino triazine   10195-67-2   10396-10-8, p-Toluene
sulfonyl semi-carbazide   26638-19-7, Dichloropropane   30143-46-5
42560-98-5, Dichlorohexafluoropropane   94458-04-5, Difluoropropane
RL: NUU (Other use, unclassified); USES (Uses)
(blowing agent; foams having increased heat distortion temperature
from blends of alkenyl aromatic polymers)

IT   1109-15-5, Tris(pentafluorophenyl)borane
RL: CAT (Catalyst use); USES (Uses)
(cocatalyst; foams having increased heat distortion temperature
from blends of alkenyl aromatic polymers)

IT   25068-12-6P, Ethylene/styrene copolymer
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM
(Technical or engineered material use); PREP (Preparation); USES (Uses)
(foam; foams having increased heat distortion temperature
from blends of alkenyl aromatic polymers)

IT   9003-53-6, Polystyrene
RL: POF (Polymer in formulation); TEM (Technical or engineered material
use); USES (Uses)
(foam; foams having increased heat distortion temperature
from blends of alkenyl aromatic polymers)

IT   223645-35-0P
RL: CAT (Catalyst use); IMF (Industrial manufacture); PREP (Preparation);
USES (Uses)
(foams having increased heat distortion temperature from blends of
alkenyl aromatic polymers)

IT   221527-94-2P   223645-36-1P   233674-45-8P   243458-96-0P   263713-70-8P
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT
(Reactant or reagent)
(foams having increased heat distortion temperature from blends of
alkenyl aromatic polymers)

IT   75-64-9, reactions   75-78-5, Dimethyldichlorosilane   235-92-7,
1H-Cyclopenta[l]phenanthrene   18039-90-2, Titanium trichloride
tetrahydrofuran complex (1:3)
RL: RCT (Reactant); RACT (Reactant or reagent)
(foams having increased heat distortion temperature from blends of
alkenyl aromatic polymers)

RE.CNT 34   THERE ARE 34 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Anon; EP 0416815 A2 1990 CAPLUS
(2) Anon; EP 514828 1992 CAPLUS
(3) Anon; WO 9400500 1994 CAPLUS
(4) Anon; WO 9532095 1995 CAPLUS
(5) Anon; WO 9809999 1995 CAPLUS
(6) Brydson; Plastic Materials, 5th edition 1989, P426
(7) Canich; US 5055438 1991 CAPLUS
(8) Canich; US 5057475 1991 CAPLUS
(9) Canich; US 5096867 1992 CAPLUS
(10) Collins; US 4323528 1982
(11) Devore; US 5470993 1995 CAPLUS
(12) Frisch; Plastic Foams, Part II P544
(13) Hirosawa; US 4379859 1983 CAPLUS
(14) Imeokparia; US 5411687 1995 CAPLUS
(15) Imeokparia; US 5434195 1995 CAPLUS
(16) Imeokparia; US 5557896 1996
(17) Imeokparia; US 5693687 1997 CAPLUS
(18) Imeokparia; US 5784845 1998
(19) Imeokparia; US 5824710 1998 CAPLUS
(20) La Pointe; US 5189192 1993 CAPLUS
(21) La Pointe; US 5321106 1994 CAPLUS

(22) La Pointe; US 5721185 1998 CAPLUS
(23) Malone; US 4824720 1989
(24) Neithamer; US 5350723 1994 CAPLUS
(25) Neithamer; US 5399635 1995 CAPLUS
(26) Nickias; US 5347024 1994 CAPLUS
(27) Randall, J; Polymer Sequence Determination, Carbon 13 NMR Method 1977, P71
(28) Rosen; US 5374696 1994 CAPLUS
(29) Stevens; US 5064802 1991 CAPLUS
(30) Stevens; US 5132380 1992 CAPLUS
(31) Timmers; US 5703187 1997 CAPLUS
(32) Wiley; US 3573152 1971
(33) Yoshimura; US 4464484 1984 CAPLUS
(34) Zizsperger; US 3504068 1970 CAPLUS

AN 2000:212259 CAPLUS
DN 132:210078
ED Entered STN: 03 Apr 2000
TI Pollution-free refrigerant used for middle- and low-temperature refrigerating system
IN Zhu, Mingshan; Shi, Lin; Han, Lizhong; Ye, Mao
PA Qinghua University, Peop. Rep. China
SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 7 pp.
CODEN: CNXXEV
DT Patent
LA Chinese
IC ICM C09K005-04
CC 51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1196378	A	19981021	CN 1997-103978	19970411
	CN 1060794	C	20010117		
PRAI	CN 1997-103978		19970411		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
CN 1196378	ICM	C09K005-04
	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]

AB The composition of refrigerant for middle- and low-temperature is selected from (1) propane (R290) 5-25, monochloro difluoro methane (HCFC-22) 40-80 and 1,1,1,2-tetrafluoroethane (HFC-134a) 5-40%, (2) R290 5-25, HCFC-22 40-80 and 1,1,1,2,3,3,3-heptafluoropropane (HFC-227ea) 5-40%, (3) R290 5-30, pentafluoroethane (HFC-125) 30-90 and difluoromethane (HFC-32) 5-40%, (4) R290 5-30, HFC-125 30-90 and 1,1,1-trifluoroethane (HFC-143a) 5-40%, (5) R290 5-30, HFC-125 30-70, HFC-32 5-50 and HFC-134a 5-35%, (6) R290 5-30, HFC-125 30-70, HFC-32 5-50 and trifluoro iodomethane (FC-1311) 5-35%, (7) R290 5-30, HFC-134a 30-70, HFC-32 5-50 and FC-1311 5-35%, and (8) R290 5-30 (or HFC-32 30-70), HFC-125 30-70, HFC-143a 5-50 and FC-1311 5-35%. The refrigerant can be used for vapor compression refrigeration and heating.
ST refrigerant compn pollution free
IT Refrigerants
(pollution-free refrigerant used for middle- and low-temperature refrigerating system)
IT 74-98-6, Propane, uses 75-10-5, Difluoromethane 75-45-6, Monochloro difluoro methane 354-33-6, Pentafluoroethane 420-46-2, 1,1,1-Trifluoroethane 431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane 811-97-2, 1,1,1,2-Tetrafluoroethane 2314-97-8, Trifluoroiodomethane

RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(pollution-free refrigerant used for middle- and low-temperature refrigerating system)

L15 ANSWER 66 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1999:761046 CAPLUS
DN 132:3943
ED Entered STN: 02 Dec 1999
TI Enlarged cell foam from blends of alkenyl aromatic polymers and α-olefin/vinyl or vinylidene interpolymers
IN Chaudhary, Bharat I.; Hood, Lawrence S.; Barry, Russell P.; Park, Chung P.
PA The Dow Chemical Company, USA
SO U.S., 16 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM C08J009-06
ICS C08J009-08; C08J009-10; C08J009-14
INCL 264053000
CC 38-3 (Plastics Fabrication and Uses)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5993707	A	19991130	US 1998-206028	19981204
	US 6355341	B1	20020312	US 1999-387014	19990831
	CA 2353093	A1	20000615	CA 1999-2353093	19991116
	WO 2000034365	A2	20000615	WO 1999-US27178	19991116
	WO 2000034365	A3	20000914		

W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW
RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	EP 1135431	A2	20010926	EP 1999-968043	19991116

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	TR 200102275	T2	20011221	TR 2001-2275	19991116
	JP 2002531658	T	20020924	JP 2000-586806	19991116
	HU 2002002672	A2	20021228	HU 2002-2672	19991116
	HU 2002002672	A3	20030828		
	NO 2001002693	A	20010723	NO 2001-2693	20010531
	MX 2001PA05580	A	20000827	MX 2001-PA5580	20010604
	US 20020155270	A1	20021024	US 2002-51695	20020118
PRAI	US 1998-206028	A3	19981204		
	US 1999-387014	A3	19990831		
	WO 1999-US27178	W	19991116		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 5993707	ICM	C08J009-06
	ICS	C08J009-08; C08J009-10; C08J009-14
	INCL	264053000
	IPCI	C08J0009-06 [ICM,6]; C08J0009-08 [ICS,6]; C08J0009-10 [ICS,6]; C08J0009-14 [ICS,6]; C08J0009-00 [ICS,6,C*]
	IPCR	C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-04 [I,A]; C08J0009-16 [I,A]
	NCL	264/053.000; 264/054.000; 264/DIG.005; 428/220.000; 521/079.000; 521/081.000; 521/134.000; 521/139.000

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                    ECLA   C08J009/00L23+L25/04; C08J009/00L25+L25/04;
                           C08J009/04+L25/04; C08J009/16+L25/04
 US 6355341         IPCI   B32B0003-26 [ICM,7]; C08J0009-00 [ICS,7]; B29D0067-00
                           [ICS,7]
                    IPCR   C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-04
                           [I,A]; C08J0009-16 [I,A]
                    NCL    428/314.800; 428/220.000; 428/314.400; 428/338.000;
                           521/079.000; 521/081.000; 521/134.000; 521/139.000
                    ECLA   C08J009/00L25+L25/04; C08J009/00L23+L25/04;
                           C08J009/04+L25/04; C08J009/16+L25/04
 CA 2353093         IPCI   C08J0009-00 [ICM,7]; C08L0025-06 [ICS,7]; C08L0025-00
                           [ICS,7,C*]; C08L0023-08 [ICS,7]; C08L0023-00 [ICS,7,C*]
                    IPCR   C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-04
                           [I,A]; C08J0009-16 [I,A]
 WO 2000034365      IPCI   C08J0009-00 [ICM,7]
                    IPCR   C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-04
                           [I,A]; C08J0009-16 [I,A]
                    ECLA   C08J009/00L25+L25/04; C08J009/00L23+L25/04;
                           C08J009/04+L25/04; C08J009/16+L25/04
 EP 1135431         IPCI   C08J0009-00 [ICM,6]; C08L0023-08 [ICS,6]; C08L0023-00
                           [ICS,6,C*]; C08L0025-06 [ICS,6]; C08L0025-00 [ICS,6,C*]
                    IPCR   C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-04
                           [I,A]; C08J0009-16 [I,A]
 TR 200102275       IPCI   C08J0009-00 [ICM,7]; C08L0023-08 [ICS,7]; C08L0023-00
                           [ICS,7,C*]; C08L0025-06 [ICS,7]; C08L0025-00 [ICS,7,C*]
                    IPCR   C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-04
                           [I,A]; C08J0009-16 [I,A]
 JP 2002531658      IPCI   C08J0009-04 [ICM,7]; C08J0009-04 [ICS,7]; C08J0009-00
                           [ICS,7,C*]; C08L0025-00 [ICS,7]
                    IPCR   C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-04
                           [I,A]; C08J0009-16 [I,A]
 HU 2002002672      IPCI   C08J0009-00 [ICM,7]
                    IPCR   C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-04
                           [I,A]; C08J0009-16 [I,A]
 NO 2001002693      IPCI   C08J [ICM,7]
                    IPCR   C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-04
                           [I,A]; C08J0009-16 [I,A]
 MX 2001PA05580     IPCI   C08J0009-00 [ICM,5]
 US 20020155270     IPCI   B32B0003-26 [ICM,7]
                    IPCR   C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-04
                           [I,A]; C08J0009-16 [I,A]
                    NCL    428/305.500; 428/304.400
                    ECLA   C08J009/00L25+L25/04; C08J009/00L23+L25/04;
                           C08J009/04+L25/04; C08J009/16+L25/04
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AB This invention pertains to a composition and a process for preparing a closed cell alkenyl aromatic polymer foam having enlarged cell size, comprising one or more alkenyl aromatic polymers, one or more substantially random interpolymers, one or more blowing agents having zero ozone depletion potential and optionally one or more co-blowing agents, and (or) nucleating agents and additives. This combination allows the manufacture of closed cell, low d. alkenyl aromatic polymer foam of enlarged cell size, when blowing agents of relatively high nucleation potential are employed. When such blowing agents are used with alkenyl aromatic polymers in the absence of the substantially random interpolymers, small cell foam result.

ST polyolefin large cell foam

IT Plastic foam
Polyolefins
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(Enlarged cell foam from blends of alkenyl aromatic polymers and

α-olefin/vinyl or vinylidene interpolymers)
IT Aluminoxanes
RL: CAT (Catalyst use); USES (Uses)
(iso-Bu Me, branched, cyclic and linear; Enlarged cell foam from blends of alkenyl aromatic polymers and α-olefin/vinyl or vinylidene interpolymers)
IT Polymerization catalysts
(metallocene; Enlarged cell foam from blends of alkenyl aromatic polymers and α-olefin/vinyl or vinylidene interpolymers)
IT 1109-15-5
RL: CAT (Catalyst use); USES (Uses)
(Enlarged cell foam from blends of alkenyl aromatic polymers and α-olefin/vinyl or vinylidene interpolymers)
IT 204201-36-5P 210286-57-0P 233674-45-8P 239805-86-8P
RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(Enlarged cell foam from blends of alkenyl aromatic polymers and α-olefin/vinyl or vinylidene interpolymers)
IT 74-82-8, Methane, uses 74-84-0, Ethane, uses 74-98-6, Propane, uses 75-10-5, HFC-32 75-28-5, Isobutane 75-37-6, HFC-152a 77-92-9, Citric acid, uses 78-67-1, Aibn 78-78-4, Isopentane 80-17-1, Benzenesulfonyl hydrazide 106-97-8, Butane, uses 109-66-0, Pentane, uses 123-77-3, Azodicarbonamide 124-38-9, Carbon dioxide, uses 133-55-1 144-55-8, Sodium bicarbonate, uses 287-92-3, Cyclopentane 353-36-6, HFC-161 354-33-6, HFC-125 359-35-3, HFC-134 420-46-2, HFC-143a 463-82-1, Neopentane 811-97-2, HFC-134a 2551-62-4, Sulfur hexafluoride 3955-25-7, Barium azodicarboxylate 7440-37-1, Argon, uses 7727-37-9, Nitrogen, uses 10105-42-7 10195-67-2 10396-10-8, p-Toluenesulfonyl semicarbazide
RL: NUU (Other use, unclassified); USES (Uses)
(Enlarged cell foam from blends of alkenyl aromatic polymers and α-olefin/vinyl or vinylidene interpolymers)
IT 9003-53-6, Polystyrene 25068-12-6, Styrene-ethylene copolymer
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(Enlarged cell foam from blends of alkenyl aromatic polymers and α-olefin/vinyl or vinylidene interpolymers)
IT 14927-64-1 210286-58-1 210286-61-6
RL: RCT (Reactant); RACT (Reactant or reagent)
(Enlarged cell foam from blends of alkenyl aromatic polymers and α-olefin/vinyl or vinylidene interpolymers)
IT 210286-60-5P 221527-94-2P 221527-95-3P 223645-34-9P 223645-36-1P 243458-96-0P
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(Enlarged cell foam from blends of alkenyl aromatic polymers and α-olefin/vinyl or vinylidene interpolymers)
RE.CNT 26 THERE ARE 26 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

(1) Anon; EP 0416815 1990 CAPLUS
(2) Anon; EP 514828 1992 CAPLUS
(3) Anon; WO 95/32095 1995 CAPLUS
(4) Canich; US 5055438 1991 CAPLUS
(5) Canich; US 5057475 1991 CAPLUS
(6) Canich; US 5096867 1992 CAPLUS
(7) Chaudhary; US 5776389 1998
(8) Collins; US 4323528 1982
(9) Devore; US 5470993 1995 CAPLUS
(10) Hatano; US 3953558 1976 CAPLUS
(11) Hirosawa; US 4379859 1983 CAPLUS
(12) La Pointe; US 5189192 1993 CAPLUS

(13) La Pointe; US 5321106 1994 CAPLUS
(14) La Pointe; US 5721185 1998 CAPLUS
(15) Malone; US 4824720 1989
(16) Neithamer; US 5350723 1994 CAPLUS
(17) Neithamer; US 5399635 1995 CAPLUS
(18) Nickias; US 5347024 1994 CAPLUS
(19) Rosen; US 5374696 1994 CAPLUS
(20) Stevens; US 5064802 1991 CAPLUS
(21) Stevens; US 5132380 1992 CAPLUS
(22) Suh; US 4229396 1980
(23) Suh; US 5489407 1996
(24) Timmers; US 5703187 1997 CAPLUS
(25) Wiley; US 3573152 1971
(26) Zizlsperger; US 3504068 1970 CAPLUS

L15 ANSWER 67 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1999:614016 CAPLUS
DN 131:229866
ED Entered STN: 26 Sep 1999
TI Open-cell polystyrene foams from interpolymer blends
IN Park, Chung P.; Imeokparia, Daniel D.; Chaudhary, Bharat I.
PA The Dow Chemical Company, USA
SO PCT Int. Appl., 65 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C08J009-00
ICS C08L023-02; C08L025-00
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 29
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9947592	A1	19990923	WO 1999-US5706	19990315
	W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW				
	RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	CA 2324277	A1	19990923	CA 1999-2324277	19990315
	AU 9930919	A	19991011	AU 1999-30919	19990315
	AU 747560	B2	20020516		
	US 6093752	A	20000725	US 1999-268585	19990315
	BR 9908944	A	20001114	BR 1999-8944	19990315
	EP 1068260	A1	20010117	EP 1999-912571	19990315
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, NL, SE, FI				
	TR 200002668	T2	20010221	TR 2000-2668	19990315
	HU 2001001185	A2	20010730	HU 2001-1185	19990315
	JP 2002506903	T	20020305	JP 2000-536781	19990315
	TW 457265	B	20011001	TW 1999-88104081	19990601
	US 6174471	B1	20010116	US 2000-553306	20000420
	NO 2000004632	A	20001108	NO 2000-4632	20000915
	MX 2000PA09102	A	20010328	MX 2000-PA9102	20000915
PRAI	US 1998-78091P	P	19980316		
	US 1999-268585	A3	19990315		
	WO 1999-US5706	W	19990315		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES

WO 9947592	ICM	C08J009-00
	ICS	C08L023-02; C08L025-00
	IPCI	C08J0009-00 [ICM,6]; C08L0023-02 [ICS,6]; C08L0023-00 [ICS,6,C*]; C08L0025-00 [ICS,6]
	IPCR	C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08L0023-00 [I,C*]; C08L0023-02 [I,A]; C08L0023-08 [I,A]; C08L0025-00 [I,C*]; C08L0025-00 [I,A]; C08L0025-04 [N,A]
	ECLA	C08J009/00L25+L25/04; C08L023/08+B2; M08L; M08L
CA 2324277	IPCI	C08J0009-00 [ICM,6]; C08L0025-00 [ICS,6]; C08L0023-02 [ICS,6]; C08L0023-00 [ICS,6,C*]
	IPCR	C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08L0023-00 [I,C*]; C08L0023-02 [I,A]; C08L0023-08 [I,A]; C08L0025-00 [I,C*]; C08L0025-00 [I,A]; C08L0025-04 [N,A]
AU 9930919	IPCI	C08J0009-00 [ICM,6]; C08L0023-02 [ICS,6]; C08L0023-00 [ICS,6,C*]; C08L0025-00 [ICS,6]
	IPCR	C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08L0023-00 [I,C*]; C08L0023-02 [I,A]; C08L0023-08 [I,A]; C08L0025-00 [I,C*]; C08L0025-00 [I,A]; C08L0025-04 [N,A]
US 6093752	IPCI	C08J0009-08 [ICM,7]; C08J0009-10 [ICS,7]; C08J0009-12 [ICS,7]; C08J0009-14 [ICS,7]; C08J0009-00 [ICS,7,C*]
	IPCR	C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08L0023-00 [I,C*]; C08L0023-08 [I,A]; C08L0025-00 [N,C*]; C08L0025-04 [N,A]
	NCL	521/139.000; 521/079.000; 521/081.000; 521/134.000; 521/140.000
	ECLA	C08J009/00L23+L25/06; C08J009/00L25+L25/04; C08L023/08+B2
BR 9908944	IPCI	C08J0009-00 [ICM,7]; C08L0023-02 [ICS,7]; C08L0023-00 [ICS,7,C*]; C08L0025-00 [ICS,7]
	IPCR	C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08L0023-00 [I,C*]; C08L0023-02 [I,A]; C08L0023-08 [I,A]; C08L0025-00 [I,C*]; C08L0025-00 [I,A]; C08L0025-04 [N,A]
EP 1068260	IPCI	C08J0009-00 [ICM,6]; C08L0023-02 [ICS,6]; C08L0023-00 [ICS,6,C*]; C08L0025-00 [ICS,6]
	IPCR	C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08L0023-00 [I,C*]; C08L0023-02 [I,A]; C08L0023-08 [I,A]; C08L0025-00 [I,C*]; C08L0025-00 [I,A]; C08L0025-04 [N,A]
TR 200002668	IPCI	C08J0009-00 [ICM,7]; C08L0023-02 [ICS,7]; C08L0023-00 [ICS,7,C*]; C08L0025-00 [ICS,7]
	IPCR	C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08L0023-00 [I,C*]; C08L0023-02 [I,A]; C08L0023-08 [I,A]; C08L0025-00 [I,C*]; C08L0025-00 [I,A]; C08L0025-04 [N,A]
HU 2001001185	IPCI	C08J0009-00 [ICM,7]
JP 2002506903	IPCI	C08J0009-04 [ICM,7]; C08J0009-00 [ICM,7,C*]; C08L0023-02 [ICS,7]; C08L0023-00 [ICS,7,C*]; C08L0025-00 [ICS,7]
	IPCR	C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08L0023-00 [I,C*]; C08L0023-02 [I,A]; C08L0023-08 [I,A]; C08L0025-00 [I,C*]; C08L0025-00 [I,A]; C08L0025-04 [N,A]
TW 457265	IPCI	C08J0009-00 [ICM,7]
	IPCR	C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08L0023-00 [I,C*]; C08L0023-02 [I,A]; C08L0023-08 [I,A]; C08L0025-00 [I,C*]; C08L0025-00 [I,A]; C08L0025-04 [N,A]
US 6174471	IPCI	C08J0009-08 [ICM,7]; C08J0009-10 [ICS,7]; C08J0009-00

[ICS,7,C*]
IPCR C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-14 [I,A]
NCL 264/053.000; 521/060.000; 521/079.000; 521/081.000; 521/134.000; 521/140.000
ECLA C08J009/00L23+L25/06; C08J009/14+L25/06
NO 2000004632 IPCI C08J0009-00 [ICM,7]
IPCR C08J0009-04 [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08L0023-00 [I,C*]; C08L0023-02 [I,A]; C08L0023-08 [I,A]; C08L0025-00 [I,C*]; C08L0025-00 [I,A]; C08L0025-04 [N,A]
MX 2000PA09102 IPCI C08J0009-00 [ICM,5]; C08L0023-02 [ICS,5]; C08L0023-00 [ICS,5,C*]; C08L0025-00 [ICS,5]

AB The title foam is formed from a blend of polystyrene and an ethylene-styrene interpolymer. The ethylene-styrene interpolymer functions as a cell opening agent, and is used to control the open cell content of the resulting foam, which may contain >80 percent open cells. The foam is produced by an extrusion process in which CO2 is used as the preferred blowing agent. The resulting foams may be formed into beads, sheets, etc.

ST polystyrene open cellular foam; ethylene styrene open cellular foam; interpolymer polystyrene blend foam; metallocene catalyst polystyrene blend foam

IT Blowing agents
(Open-cell polystyrene foams from interpolymer blends)

IT Carbon black, uses
RL: NUU (Other use, unclassified); USES (Uses)
(Open-cell polystyrene foams from interpolymer blends)

IT Plastic foams
Polymer blends
Polyolefins
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(Open-cell polystyrene foams from interpolymer blends)

IT Polymerization catalysts
(metallocene; Open-cell polystyrene foams from interpolymer blends)

IT 204201-36-5P 210286-57-0P 210286-60-5P 210286-61-6P 210286-62-7P 223645-35-0P 233674-45-8P
RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(Open-cell polystyrene foams from interpolymer blends)

IT 124-38-9, Carbon dioxide, uses
RL: MOA (Modifier or additive use); USES (Uses)
(Open-cell polystyrene foams from interpolymer blends)

IT 64-17-5, Ethanol, uses 67-56-1, Methanol, uses 67-63-0, Isopropanol, uses 71-23-8, Propanol, uses 71-55-6, 1,1,1-Trichloroethane 74-82-8, Methane, uses 74-84-0, Ethane, uses 74-87-3, Methyl chloride, uses 74-98-6, Propane, uses 75-00-3, Ethyl chloride 75-09-2, uses 75-10-5, HFC-32 75-28-5, Isobutane 75-37-6, HFC 152a 75-45-6, HCFC-22 75-68-3, HCFC-142b 75-69-4, CFC-11 75-71-8, CFC-12 75-73-0 76-13-1, CFC-113 76-14-2, CFC-114 76-16-4 76-19-7, Perfluoropropane 77-92-9, uses 78-67-1, AIBN 78-78-4, Isopentane 80-17-1, Benzenesulfonyl hydrazide 106-97-8, Butane, uses 109-66-0, Pentane, uses 115-25-3, Perfluorocyclobutane 123-77-3, Diazenedicarboxamide 144-55-8, Sodium bicarbonate, uses 287-92-3, Cyclopentane 306-83-2, HCFC-123 353-36-6, Ethyl fluoride 354-33-6 355-25-9, Perfluorobutane 359-35-3, HFC-134 420-45-1, 2,2-Difluoropropane 420-46-2, HFC 143a 421-07-8, 1,1,1-Trifluoropropane 463-82-1, Neopentane 593-53-3, Methyl fluoride 811-97-2, HFC 134a 1717-00-6, HCFC-141b 2551-62-4, Sulfur hexafluoride 2837-89-0, HCFC-124 3851-16-9 3955-25-7 7440-37-1,

Argon, uses   7440-59-7, Helium, uses   7631-86-9, Silica, uses
7727-37-9, Nitrogen, uses   7732-18-5, Water, uses   7782-42-5, Graphite,
uses   10195-67-2   10396-10-8   13463-67-7, Titanium dioxide, uses
14807-96-6, Talc, uses   26638-19-7, Dichloropropane   30143-46-5
42560-98-5, DiChlorohexafluoropropane   94458-04-5, Difluoropropane
RL: NUU (Other use, unclassified); USES (Uses)
(Open-cell polystyrene foams from interpolymer blends)

IT   9003-53-6, Polystyrene   25068-12-6, Ethylene-styrene copolymer
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(Open-cell polystyrene foams from interpolymer blends)

IT   886-65-7, 1,4-Diphenylbutadiene   14927-64-1   223645-34-9
RL: RCT (Reactant); RACT (Reactant or reagent)
(Open-cell polystyrene foams from interpolymer blends)

RE.CNT 1   THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Park, C; WO 9810014 A 1998 CAPLUS

L15 ANSWER 68 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN

AN   1999:584506 CAPLUS

DN   131:230427

ED   Entered STN: 17 Sep 1999

TI   Description of the vapor-liquid equilibrium in binary refrigerant/lubricating oil systems by means of an extended Flory-Huggins model

AU   Tesser, R.; Musso, E.; Di Serio, M.; Basile, G.; Santacesaria, E.

CS   Dipartimento di Chimica dell'Universita di Napoli, Naples, 80134, Italy

SO   Journal of Fluorine Chemistry (1999), 99(1), 29-36
CODEN: JFLCAR; ISSN: 0022-1139

PB   Elsevier Science S.A.

DT   Journal

LA   English

CC   48-5 (Unit Operations and Processes)
Section cross-reference(s): 68

AB   In the present work, the extended Flory-Huggins equation is applied to describe the vapor-liquid equilibrium in binary mixts. usually used in refrigerating cycle machines and constituted by a fluorinated refrigerant (CFC) and a lubricating oil. With the purpose of testing the model, some isothermal measurements of equilibrium pressure were carried out for mixts. with different CFC compns. in oil related to the refrigerants R134a, R143a and R236fa mixed with a com. lubricating oil (Icematic SW32). Furthermore, the model was applied to exptl. data retrieved from the literature, and the adjustable correlation parameters were determined both for these, and for exptl. isotherms.

ST   vapor liq equil binary refrigerant lubricating oil mixt

IT   Lubricating oils
Refrigerants
Refrigerating apparatus
Vapor-liquid equilibrium
(description of the vapor-liquid equilibrium in binary refrigerant/lubricating oil systems by means of an extended Flory-Huggins model)

IT   Alcohols, properties
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(polyhydric, esters; description of the vapor-liquid equilibrium in binary refrigerant/lubricating oil systems by means of an extended Flory-Huggins model)

IT   75-10-5, R 32 354-33-6 420-46-2, R 143a
690-39-1, R 236Fa 811-97-2, R 134a   168256-36-8, Castrol
icematic sw32
RL: PRP (Properties); TEM (Technical or engineered material use); USES

(Uses)
(description of the vapor-liquid equilibrium in binary refrigerant/lubricating oil systems by means of an extended Flory-Huggins model)

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Bae, Y; J Appl Polym Sci 1993, V47, P1193 CAPLUS
(2) Buzzi, G; Ing Chim Ital 1968, V4, P171
(3) Qian, C; Macromolecules 1991, V24, P1655 CAPLUS
(4) Takaishi, Y; Proceedings of Commissions B1 of IIR/IIF 1996
(5) Takaishi, Y; Proceedings of Commissions B1/B2 of IIR/IIF 1993, P141 CAPLUS
(6) Takaishi, Y; Proceedings of Commissions B1/B2 of IIR/IIF 1994, P99 CAPLUS

AN 1999:464335 CAPLUS
DN 131:103843
ED Entered STN: 29 Jul 1999
TI Halogenated hydrocarbon refrigerant compositions containing polymeric oil-return agents
IN Shealy, Glenn Scott
PA E. I. Du Pont de Nemours & Co., USA
SO PCT Int. Appl., 36 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C09K005-04
ICS C10M171-00
CC 47-4 (Apparatus and Plant Equipment)
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9936485	A1	19990722	WO 1999-US1031	19990115
	W: AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GD, GE, HR, HU, ID, IL, IN, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, SG, SI, SK, SL, TR, TT, UA, UZ, VN, YU, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	CA 2314080	A1	19990722	CA 1999-2314080	19990115
	AU 9922342	A	19990802	AU 1999-22342	19990115
	AU 761993	B2	20030612		
	EP 1047747	A1	20001102	EP 1999-902335	19990115
	EP 1047747	B1	20020403		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, PT, IE, FI				
	BR 9908205	A	20001128	BR 1999-8205	19990115
	JP 2002509179	T	20020326	JP 2000-540194	19990115
	AT 215596	T	20020415	AT 1999-902335	19990115
	ES 2172979	T3	20021001	ES 1999-902335	19990115
	MX 2000PA06543	A	20020311	MX 2000-PA6543	20000630
PRAI	US 1998-71652P	P	19980116		
	US 1999-231847	A	19990115		
	WO 1999-US1031	W	19990115		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 9936485	ICM	C09K005-04
	ICS	C10M171-00
	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C10M0171-00 [ICS,6]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*]; C10M0101-00 [I,A]; C10M0105-00 [I,C*];

C10M0105-02 [I,A]; C10M0147-00 [I,C*]; C10M0147-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]

ECLA C09K005/04B4B; C10M171/00R; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N

CA 2314080 IPCI C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C10M0171-00 [ICS,6]

IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]

AU 9922342 IPCI C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C10M0171-00 [ICS,6]

IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*]; C10M0101-00 [I,A]; C10M0105-00 [I,C*]; C10M0105-02 [I,A]; C10M0147-00 [I,C*]; C10M0147-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]

EP 1047747 IPCI C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C10M0171-00 [ICS,6]

IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*]; C10M0101-00 [I,A]; C10M0105-00 [I,C*]; C10M0105-02 [I,A]; C10M0147-00 [I,C*]; C10M0147-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]

BR 9908205 IPCI C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]; C10M0171-00 [ICS,7]

IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*]; C10M0101-00 [I,A]; C10M0105-00 [I,C*]; C10M0105-02 [I,A]; C10M0147-00 [I,C*]; C10M0147-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]

JP 2002509179 IPCI C10M0147-04 [ICM,7]; C10M0147-00 [ICM,7,C*]; C09K0005-04 [ICS,7]; C09K0005-00 [ICS,7,C*]; C10M0101-00 [ICS,7]; C10M0105-02 [ICS,7]; C10M0105-00 [ICS,7,C*]; C10N0040-30 [ICS,7]

IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*]; C10M0101-00 [I,A]; C10M0105-00 [I,C*]; C10M0105-02 [I,A]; C10M0147-00 [I,C*]; C10M0147-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]

AT 215596 IPCI C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]; C10M0171-00 [ICS,7]

IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*]; C10M0101-00 [I,A]; C10M0105-00 [I,C*]; C10M0105-02 [I,A]; C10M0147-00 [I,C*]; C10M0147-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]

ES 2172979 IPCI C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]; C10M0171-00 [ICS,7]

IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0101-00 [I,C*]; C10M0101-00 [I,A]; C10M0105-00 [I,C*]; C10M0105-02 [I,A]; C10M0147-00 [I,C*]; C10M0147-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]

MX 2000PA06543 IPCI C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]; C10M0171-00 [ICS,5]

OS MARPAT 131:103843

AB Refrigerant compns. containing polymeric oil-return agents which solubilize or disperse mineral and synthetic oil lubricants with hydroflurocarbon and hydroflurocarbon/hydrochlorofluorocarbon-based refrigerants are disclosed. These polymeric oil-return agents, such as copolymers of fluorinated and

non-fluorinated methacrylates, as a small proportion of an overall refrigerant composition, permit efficient return of mineral and synthetic oil lubricants from non-compressor zones back to a compressor zone in a refrigeration system operating with hydrofluorocarbon and hydrofluorocarbon/hydrochlorofluorocarbon-based refrigerants.

ST halogenated hydrocarbon refrigerant polymeric oil agent

IT Isoalkanes
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(C9-12; halogenated hydrocarbon refrigerant compns. containing polymeric oil-return agents)

IT Fluoropolymers, uses
Fluoropolymers, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(Me trifluoropropyl polysiloxane-, vinyl-terminated, FMV 4031; halogenated hydrocarbon refrigerant compns. containing polymeric oil-return agents)

IT Polysiloxanes, uses
Polysiloxanes, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(Me trifluoropropyl, vinyl-terminated, FMV 4031; halogenated hydrocarbon refrigerant compns. containing polymeric oil-return agents)

IT Surfactants
RL: USES (Uses)
(Surfynol SE; halogenated hydrocarbon refrigerant compns. containing polymeric oil-return agents)

IT Hydrocarbons, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(chlorofluorocarbons; halogenated hydrocarbon refrigerant compns. containing polymeric oil-return agents)

IT Polysiloxanes, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(di-Me, Me 3,3,3-trifluoropropyl, FS 1265; halogenated hydrocarbon refrigerant compns. containing polymeric oil-return agents)

IT Hydrocarbons, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(fluoro; halogenated hydrocarbon refrigerant compns. containing polymeric oil-return agents)

IT Lubricants
Refrigerants
(halogenated hydrocarbon refrigerant compns. containing polymeric oil-return agents)

IT Hydrocarbon oils
Hydrocarbons, uses
Kerosene
Naphthenes
Paraffin oils
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(halogenated hydrocarbon refrigerant compns. containing polymeric oil-return agents)

IT 59942-04-0
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(DMS-V 52; halogenated hydrocarbon refrigerant compns. containing polymeric oil-return agents)

IT 74-98-6, Propane, uses 75-10-5, HFC-32 75-37-6, HFC-152a

75-43-4, HCFC-21   75-45-6, HCFC-22   75-46-7, HFC-23   75-68-3, HCFC-142b
75-71-8, CFC-12   75-88-7, HCFC-133a   306-83-2, HCFC-123   354-23-4,
HCFC-123a   354-25-6, HCFC-124a 354-33-6   355-37-3   359-35-3,
HFC-134   359-58-0, HCFC-226ea   375-17-7   375-61-1, HFC-42-11p
377-36-6, HFC-338pcc   420-26-8, HFC-281ea   420-45-1, HFC-272ca
420-46-2, HFC-143a   421-48-7   422-02-6, HCFC-235cb   422-44-6
422-48-0   422-55-9, HCFC-226cb   422-56-0, HCFC-225ca   422-57-1,
HCFC-226ca   430-61-5, HFC-272fb   430-66-0, HFC-143   431-31-2, HFC-245eb
431-63-0, HFC-236ea   431-86-7, HCFC-225da   431-87-8, HCFC-226da
431-89-0   460-13-9, HFC-281fa   460-36-6   460-73-1, HFC-245fa
460-92-4, HCFC-235fa   462-39-5   507-55-1, HCFC-225cb   593-53-3, HFC-41
593-70-4, HCFC-31   662-35-1   677-55-4, HCFC-235cc   677-56-5, HFC-236cb
679-86-7, HFC-245ca   679-99-2, HCFC-235ca   680-00-2, HFC-236ca
680-17-1   690-39-1, HFC-236fa   755-23-7   755-45-3, HFC-43-10mf
811-97-2, HFC-134a   813-75-2, HFC-254ca   1615-75-4, HCFC-151a
1814-88-6, Propane, 1,1,1,2,2-pentafluoro-   2252-84-8   2837-89-0,
HCFC-124   2924-29-0   7782-41-4, Fluorine, uses   9003-53-6D,
Polystyrene, fluorinated   13474-88-9   24270-66-4, HFC-245ea   24270-68-6
28103-66-4   35230-11-6   40723-63-5, Propane, 1,1,2,2-tetrafluoro-
51346-64-6, HCFC-226ba   57534-41-5, Zonyl FSN   57534-43-7, Zonyl FSA
62126-90-3, HFC-272ea   66794-30-7   75995-72-1   95576-21-9, HFC-43-10mcf
95576-22-0   111512-56-2   119450-58-7   125624-30-8, Zerol150
128903-21-9, HCFC-225aa   134251-06-2   136013-79-1   136640-02-3
138495-42-8, HFC-43-10mee   144429-90-3   150999-42-1   151868-60-9
161629-03-4, Zonyl PHS   162102-07-0   163702-05-4   163702-07-6
170444-79-8   170445-02-0   188190-55-8   230956-35-1   231289-55-7, EAL
Arctic 22CC   231289-57-9, HAB 22
RL: DEV (Device component use); TEM (Technical or engineered material
use); USES (Uses)
(halogenated hydrocarbon refrigerant compns. containing polymeric
oil-return agents)

RE.CNT 1   THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Reyes-Gavilan, J; Proceedings of the 1997 ASHRAE Winter Meeting 1997,
V103(1), P95 CAPLUS

L15 ANSWER 70 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1999:399953 CAPLUS
DN   131:19921
ED   Entered STN: 29 Jun 1999
TI   Production of nonflammable insulating polymer foams
IN   Hammel, Howard Sims; York, Robert Oliver
PA   E. I. Du Pont de Nemours & Co., USA
SO   U.S., 20 pp., Cont.-in-part of U.S. Ser. No. 627,520.
CODEN: USXXAM
DT   Patent
LA   English
IC   ICM C08G018-14
INCL 521146000
CC   38-2 (Plastics Fabrication and Uses)
FAN.CNT 3

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5912279	A	19990615	US 1997-898979	19970723
	US 5439947	A	19950808	US 1992-973599	19921109
	US 5516811	A	19960514	US 1995-427643	19950424
	US 6121337	A	20000919	US 1997-898980	19970723
PRAI	US 1990-500051	B1	19900323		
	US 1990-577045	B1	19900828		
	US 1991-702282	B1	19910628		
	US 1992-973599	A1	19921109		
	US 1995-427643	A1	19950424		

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     US 1996-627520       A2    19960404
     US 1996-22574P       P     19960724
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 US 5912279      ICM    C08G018-14
                 INCL   521146000
                 IPCI   C08G0018-14 [ICM,6]
                 IPCR   C08J0009-00 [I,C*]; C08J0009-14 [I,A]
                 NCL    521/146.000; 521/079.000; 521/098.000; 521/131.000;
                        521/142.000; 521/155.000
                 ECLA   C08J009/14H2F
 US 5439947      IPCI   C08J0009-02 [ICM,6]; C08J0009-00 [ICM,6,C*];
                        C08L0025-06 [ICS,6]; C08L0025-00 [ICS,6,C*];
                        C08L0075-04 [ICS,6]; C08L0075-00 [ICS,6,C*]
                 IPCR   C08G0018-08 [I,A]; C08G0018-00 [I,C*]; C08G0018-00
                        [I,A]; C08G0101-00 [N,A]; C08J0009-00 [I,C*];
                        C08J0009-00 [I,A]; C08J0009-14 [I,A]; C08L0061-00
                        [I,C*]; C08L0061-04 [I,A]; C08L0061-06 [I,A];
                        C08L0071-00 [I,C*]; C08L0071-02 [I,A]
                 NCL    521/131.000; 521/134.000
                 ECLA   C08J009/00K4; C08J009/14+L75/04
 US 5516811      IPCI   C08J0009-02 [ICM,6]; C08J0009-00 [ICM,6,C*];
                        C08G0018-00 [ICS,6]; C08L0025-06 [ICS,6]; C08L0025-00
                        [ICS,6,C*]; C08L0075-04 [ICS,6]; C08L0075-00 [ICS,6,C*]
                 IPCR   C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-14
                        [I,A]
                 NCL    521/131.000; 521/155.000
                 ECLA   C08J009/00K4; C08J009/14+L75/04
 US 6121337      IPCI   C08J0009-14 [ICM,7]; C08J0009-00 [ICM,7,C*]
                 IPCR   C08J0009-00 [I,C*]; C08J0009-14 [I,A]
                 NCL    521/131.000; 521/137.000; 521/155.000; 521/170.000;
                        521/172.000; 521/174.000
                 ECLA   C08J009/14H2F
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AB   A method for preparing a non-flammable insulating thermoplastic foam body comprises (a) providing a first molten composition of thermoplastic resin, (b) introducing an effective quantity of a blowing agent composition, said blowing agent composition comprising at least 70 weight percent 1,1,2,2 tetrafluoroethane and no components having halogen substituents other than fluorine into said first molten composition (c) dispersing said blowing agent composition throughout said first molten composition to form a second molten composition;

and (d) extruding said second molten composition through a die from a region of high pressure to a region of low pressure such that said second molten composition foams upon extrusion through the die to form a closed cell thermoplastic foam body having a d. of about 0.75-15 lb per cubic foot (12 to 240 kg per cubic meter) and having cells of an average cell size of 0.1-1.5 mm.


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ST   fluorocarbon blowing agent nonflammable insulating thermoplastic
     foam
IT   Blowing agents
     Extrusion of plastics and rubbers
        (production of nonflammable insulating polymer foams)
IT   Plastic foams
     RL: POF (Polymer in formulation); TEM (Technical or engineered material
     use); USES (Uses)
        (thermoplastic; production of nonflammable insulating polymer foams
        )
IT   75-10-5, Difluoromethane   75-37-6, 1,1-Difluoroethane
     354-33-6   359-35-3, 1,1,2,2 Tetrafluoroethane 420-46-2,
     1,1,1-Trifluoroethane 811-97-2, 1,1,1,2-Tetrafluoroethane
     RL: NUU (Other use, unclassified); USES (Uses)
```

(blowing agent; production of nonflammable insulating polymer foams
)
IT 9003-53-6, Polystyrene
RL: POF (Polymer in formulation); TEM (Technical or engineered material
use); USES (Uses)
(production of nonflammable insulating polymer foams)
RE.CNT 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; EP 0096222 1983 CAPLUS
(2) Anon; EP 345580 1989 CAPLUS
(3) Bartlett; US 5182040 1993 CAPLUS
(4) Bartlett; US 5516811 1996 CAPLUS
(5) Bartlett; US 5532284 1996 CAPLUS
(6) Behme; US 5169873 1992 CAPLUS
(7) Demmin; US 5561171 1996 CAPLUS
(8) Doerge; US 5426127 1995 CAPLUS
(9) Doerge; US 5461084 1995 CAPLUS
(10) Green; US 5430071 1995 CAPLUS
(11) Green; US 5447964 1995 CAPLUS
(12) Green; US 5451614 1995 CAPLUS
(13) Green; US 5455283 1995 CAPLUS
(14) Green; US 5470891 1995 CAPLUS
(15) Green; US 5514724 1996 CAPLUS
(16) Grunbauer; US 4972003 1990 CAPLUS
(17) Hammel; US 5134171 1992 CAPLUS
(18) Lin; US 4996242 1991 CAPLUS
(19) Lin; US 5114986 1992 CAPLUS
(20) Shiflett; US 5185094 1993 CAPLUS
(21) Shiflett; US 5290466 1994 CAPLUS
(22) Smits; US 4997706 1991
(23) Smits; US 5001164 1991 CAPLUS

L15 ANSWER 71 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1999:248147 CAPLUS
DN 130:283906
ED Entered STN: 23 Apr 1999
TI Coping without the common coolant
AU Campbell, Nick; McCulloch, Archie
CS ICI Klea, The Heath, Runcorn, WA7 4QF, UK
SO Chemistry & Industry (London) (1999), (7), 262-263, 266-267
CODEN: CHINAG; ISSN: 0009-3068
PB Society of Chemical Industry
DT Journal
LA English
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 59
AB The development and use of alternative refrigerants to chlorofluorocarbons
are discussed for domestic refrigeration, automotive air
conditioning, retail refrigeration and industrial
refrigeration and air conditioning.
ST chlorofluorocarbon coolant alternative
IT Refrigerants
Refrigeration
(alternatives to chlorofluorocarbon coolants)
IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(alternatives to chlorofluorocarbon coolants)
IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(chlorofluorocarbons; alternatives to chlorofluorocarbon coolants)
IT Air conditioning
(cooling; alternatives to chlorofluorocarbon coolants)

```
IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro; alternatives to chlorofluorocarbon coolants)
IT   74-98-6, Propane, uses 75-10-5, HFC 32   75-37-6, HFC 152a
     75-45-6, HCFC 22   75-68-3, HCFC 142b   75-69-4, CFC 11   75-71-8, CFC 12
     76-13-1, CFC 113   76-14-2, CFC 114   76-15-3, CFC 115   106-97-8, Butane,
     uses   287-92-3, Cyclopentane   306-83-2, HCFC 123 354-33-6, HFC
     125   406-58-6, HFC 365mfc 420-46-2, HFC 143a   431-89-0, HFC
     227ea   460-73-1, HFC 245fa 811-97-2, HFC 134a   1717-00-6, HCFC
     141b   2837-89-0, HCFC 124   7664-41-7, Ammonia, uses   39432-81-0, CFC
     502   50815-73-1, R 503   127564-92-5, HCFC 225   133023-17-3, R 410A
     150621-87-7, R 507   150743-07-0, R 404A   158675-78-6, R 407C
     158675-80-0
     RL: TEM (Technical or engineered material use); USES (Uses)
        (alternatives to chlorofluorocarbon coolants)
RE.CNT  12    THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD
```

```
RE
(1) Anon; "The Montreal Protocol on substances that deplete the ozone layer'
    Nairobi:United Nations Environment Programme 1997
(2) Anon; ` Protocol concerning the control of emissions of volatile organic
    compounds or their transboundary fluxes' 1994
(3) Anon; ` Report of the Technology and Economic Assessment Panel (TEAP)'
    Nairobi:United Nation's Environment Programme 1998
(4) Bonn Unfccc; ` Kyoto Protocol to the UN Framework Convention on Climate
    Change' 1998
(5) British Refrigeration Association; ` Guideline methods of calculating TEWI'
    1996, issue 1
(6) Campbell, N; Trans IChemE 1998, V76B, P239
(7) DC Afeas; ` Production sales and atmospheric release of fluorocarbons
    through 1996' 1998
(8) Derwent, R; Atmos Environ 1996, V30(2), P181 CAPLUS
(9) Farman, J; Nature 1985, V315, P207 CAPLUS
(10) Fischer, S; ` Energy and global warming impact of CFC alternative
    technologies' US Dept of Energy and AFEAS (Alternatives to Fluorocarbons
    Environmental Acceptability Study 1991
(11) Fischer, S; ` Energy and global warming impacts of not-in-kind and next
    generation CFC and HCFC alternatives' 1994
(12) Houghton, J; ` Climate change 1995
```

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L15  ANSWER 72 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1999:208929  CAPLUS
DN   130:284362
ED   Entered STN:  02 Apr 1999
TI   Refrigerant compressor and refrigerating apparatus
IN   Tojo, Kenji; Ueda, Hideyuki; Tomita, Yoshikatsu
PA   Hitachi, Ltd., Japan
SO   Jpn. Kokai Tokkyo Koho, 7 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  F04C029-02
     ICS  F04C029-00; F25B001-00; F25B001-04; C10M105-18; C10N040-30
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   JP 11082348          A     19990326    JP 1997-246480         19970911
     JP 3627467          B2     20050309
     CN 1210948           A     19990317    CN 1998-119147         19980911
     CN 1107806           C     20030507
PRAI JP 1997-246480       A     19970911
CLASS
```

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 11082348	ICM	F04C029-02
	ICS	F04C029-00; F25B001-00; F25B001-04; C10M105-18; C10N040-30
	IPCI	F04C0029-02 [ICM,6]; F04C0029-00 [ICS,6]; F25B0001-00 [ICS,6]; F25B0001-04 [ICS,6]; C10M0105-18 [ICS,6]; C10M0105-00 [ICS,6,C*]; C10N0040-30 [ICS,6]
CN 1210948	IPCI	F04C0029-02 [ICM,6]; F04C0018-22 [ICS,6]; C09K0005-04 [ICS,6]; C09K0005-00 [ICS,6,C*]
	IPCR	F04C0029-00 [I,C*]; F04C0029-00 [I,A]; C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C10M0107-00 [I,C*]; C10M0107-24 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]; F01C0021-00 [I,C*]; F01C0021-02 [I,A]; F04B0039-02 [I,C*]; F04B0039-02 [I,A]; F04C0018-02 [I,C*]; F04C0018-02 [I,A]; F04C0029-02 [I,C*]; F04C0029-02 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]; F25B0001-04 [I,C*]; F25B0001-04 [I,A]; F25B0031-00 [N,C*]; F25B0031-00 [N,A]

AB A refrigerating apparatus, comprising a compressor having a compression zone for suction compression of fluorohydrocarbon-series refrigerants and a condenser, is characterized in that a sliding bearing for sliding support of a driving shaft for the compressor is made of Pb-containing part and a lubricating oil of ether oil is used for lubrication of the sliding bearing and refrigerant circuit.

ST refrigerant compressor refrigerating app lubricating oil; lead contg sliding bearing fluorohydrocarbon refrigerant; ether lubricating oil refrigerant compressor refrigerator

IT Ethers, uses
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(cyclic, lubricating oil; refrigerant compressor and refrigerating apparatus)

IT Hydrocarbons, uses
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(fluoro, refrigerants; refrigerant compressor and refrigerating apparatus)

IT Refrigerants
(fluorohydrocarbons; refrigerant compressor and refrigerating apparatus)

IT Lubricating oils
(polyvinyl ethers; refrigerant compressor and refrigerating apparatus)

IT Refrigerating apparatus
(refrigerant compressor and refrigerating apparatus)

IT Bearings
(sliding, lead-containing; refrigerant compressor and refrigerating apparatus)

IT Ethers, uses
Ethers, uses
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(vinyl, polymers, lubricating oil; refrigerant compressor and refrigerating apparatus)

IT 75-10-5, HFC 32 354-33-6, HFC 125 420-46-2, HFC 143a 811-97-2, HFC 134a 133023-17-3, R 410A 150621-87-7, HFC 507A 150743-07-0, R 404A 158675-78-6, R 407c
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(refrigerant; refrigerant compressor and refrigerating apparatus)

```
IT   11108-65-9, Lead bronze   12731-48-5
     RL: DEV (Device component use); USES (Uses)
        (sliding bearing made of; refrigerant compressor and
        refrigerating apparatus)

L15  ANSWER 73 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1999:96298  CAPLUS
DN   130:154627
ED   Entered STN:  12 Feb 1999
TI   Flame-resistant rigid polyurethane foams blown with
     hydrofluorocarbons
IN   Singh, Sachchida Nand; Burns, Steven Bruce; Jones, Patricia Ann
PA   Imperial Chemical Industries Plc, UK
SO   PCT Int. Appl., 38 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM  C08J009-14
     ICS  C08J009-00; C08G018-42; C08L075-04
CC   38-3 (Plastics Fabrication and Uses)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   WO 9905204           A1    19990204    WO 1998-EP4259         19980709
         W:  AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE,
             DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG,
             KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX,
             NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT,
             UA, UG, UZ, VN, YU, ZW
         RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES,
             FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI,
             CM, GA, GN, GW, ML, MR, NE, SN, TD, TG
     CA 2294821           A1    19990204    CA 1998-2294821        19980709
     AU 9890643           A     19990216    AU 1998-90643          19980709
     TR 200000192         T2    20000522    TR 2000-192            19980709
     BR 9810784           A     20000725    BR 1998-10784          19980709
     EP 1023367           A1    20000802    EP 1998-942529         19980709
     EP 1023367           B1    20031001
         R:  BE, DE, DK, ES, FR, GB, IT, NL, SE, SI
     HU 2000004077        A2    20010328    HU 2000-4077           19980709
     HU 2000004077        A3    20010428
     US 20020013379       A1    20020131    US 1998-122132         19980724
     US 6372811           B2    20020416
     TW 461904            B     20011101    TW 1998-87112695       19980801
PRAI US 1997-53701P       P     19970725
     WO 1998-EP4259       W     19980709
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 9905204      ICM    C08J009-14
                 ICS    C08J009-00; C08G018-42; C08L075-04
                 IPCI   C08J0009-14 [ICM,6]; C08J0009-00 [ICS,6]; C08G0018-42
                        [ICS,6]; C08G0018-00 [ICS,6,C*]; C08L0075-04 [ICS,6];
                        C08L0075-00 [ICS,6,C*]
                 IPCR   C08G0018-00 [I,C*]; C08G0018-42 [I,A]; C08G0018-48
                        [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A];
                        C08J0009-14 [I,A]
                 ECLA   C08G018/42B2; C08G018/48A8; C08J009/00K49+L75/04;
                        C08J009/00K49+L75/05; C08J009/14H2F+L75/05; M08G; M08G
 CA 2294821      IPCI   C08J0009-14 [ICM,7]; C08J0009-00 [ICS,7]; C08G0018-42
                        [ICS,7]; C08G0018-00 [ICS,7,C*]
                 IPCR   C08G0018-00 [I,C*]; C08G0018-42 [I,A]; C08G0018-48
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                        [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A];
                        C08J0009-14 [I,A]
 AU 9890643      IPCI   C08J0009-14 [ICM,6]; C08J0009-00 [ICS,6]; C08G0018-42
                        [ICS,6]; C08G0018-00 [ICS,6,C*]; C08L0075-04 [ICS,6];
                        C08L0075-00 [ICS,6,C*]
                 IPCR   C08G0018-00 [I,C*]; C08G0018-42 [I,A]; C08G0018-48
                        [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A];
                        C08J0009-14 [I,A]
 TR 200000192    IPCI   C08J0009-14 [ICM,7]; C08J0009-00 [ICS,7]; C08G0018-42
                        [ICS,7]; C08G0018-00 [ICS,7,C*]
                 IPCR   C08G0018-00 [I,C*]; C08G0018-42 [I,A]; C08G0018-48
                        [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A];
                        C08J0009-14 [I,A]
 BR 9810784      IPCI   C08J0009-14 [ICM,7]; C08J0009-00 [ICS,7]
                 IPCR   C08G0018-00 [I,C*]; C08G0018-42 [I,A]; C08G0018-48
                        [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A];
                        C08J0009-14 [I,A]
 EP 1023367      IPCI   C08J0009-14 [ICM,6]; C08J0009-00 [ICS,6]; C08G0018-42
                        [ICS,6]; C08G0018-00 [ICS,6,C*]; C08L0075-04 [ICI,6];
                        C08L0075-00 [ICI,6,C*]
                 IPCR   C08G0018-00 [I,C*]; C08G0018-42 [I,A]; C08G0018-48
                        [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A];
                        C08J0009-14 [I,A]
 HU 2000004077   IPCI   C08J0009-14 [ICM,7]; C08J0009-00 [ICM,7,C*]
                 IPCR   C08G0018-00 [I,C*]; C08G0018-42 [I,A]; C08G0018-48
                        [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A];
                        C08J0009-14 [I,A]
                 ECLA   C08G018/42B2; C08G018/48A8; C08J009/00K49+L75/04;
                        C08J009/00K49+L75/05; C08J009/14H2F+L75/05; M08G; M08G
 US 20020013379  IPCI   C08J0009-00 [ICM,7]; C08G0018-10 [ICS,7]; C08G0018-00
                        [ICS,7,C*]
                 IPCR   C08G0018-00 [I,C*]; C08G0018-42 [I,A]; C08G0018-48
                        [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A];
                        C08J0009-14 [I,A]
                 NCL    521/174.000; 521/131.000; 521/168.000; 521/172.000;
                        521/173.000
                 ECLA   C08G018/42B2; C08G018/48A8; C08J009/00K49+L75/04;
                        C08J009/14H2F+L75/04; M08G; M08G
 TW 461904       IPCI   C08G0018-00 [ICM,7]; C08J0009-04 [ICS,7]; C08J0009-00
                        [ICS,7,C*]
                 IPCR   C08G0018-00 [I,C*]; C08G0018-42 [I,A]; C08G0018-48
                        [I,A]; C08J0009-00 [I,C*]; C08J0009-00 [I,A];
                        C08J0009-14 [I,A]
OS   MARPAT 130:154627
AB   Rigid polyurethane foams having improved flame resistance are
     disclosed.  The foams are prepared from a composition containing (a) an
     isocyanate, (b) an isocyanate-reactive composition containing an aromatic
polyester
     polyol, (c) an organo phosphorus compound and (d) a C1 to C4
     hydrofluorocarbon.
ST   hydrofluorocarbon blowing agent polyurethane foam; phosphate
     fireproofing agent polyurethane foam
IT   Hydrocarbons, uses
     RL: NUU (Other use, unclassified); USES (Uses)
        (fluoro, blowing agent; flame-resistant rigid polyurethane
        foams blown with hydrofluorocarbons)
IT   Polyurethanes, uses
     RL: IMF (Industrial manufacture); TEM (Technical or engineered material
     use); PREP (Preparation); USES (Uses)
        (foam; flame-resistant rigid polyurethane foams
        blown with hydrofluorocarbons)
IT   Blowing agents
```

(hydrofluorocarbons; flame-resistant rigid polyurethane foams
blown with hydrofluorocarbons)

IT Fireproofing agents
(organo phosphorus compds.; flame-resistant rigid polyurethane
foams blown with hydrofluorocarbons)

IT 75-10-5, Difluoromethane 75-37-6, 1,1-Difluoroethane 75-46-7,
Trifluoromethane 354-33-6, Pentafluoroethane 406-58-6,
1,1,1,3,3-Pentafluorobutane 407-59-0, 1,1,1,4,4,4-Hexafluorobutane
420-46-2, 1,1,1-Trifluoroethane 460-73-1, 1,1,1,3,3-
Pentafluoropropane 811-97-2, 1,1,1,2-Tetrafluoroethane
33660-75-2, Heptafluoropropane 37145-47-4, Pentafluoropropane
141529-32-0, Pentafluorobutane
RL: NUU (Other use, unclassified); USES (Uses)
(blowing agent; flame-resistant rigid polyurethane foams
blown with hydrofluorocarbons)

IT 192648-01-4P 220237-78-5P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material
use); PREP (Preparation); USES (Uses)
(flame-resistant rigid polyurethane foams blown with
hydrofluorocarbons)

IT 78-40-0, Triethyl Phosphate 6145-73-9, Tris(β-
chloropropyl)phosphate
RL: MOA (Modifier or additive use); USES (Uses)
(flame-resistant rigid polyurethane foams blown with
hydrofluorocarbons)

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Bitterfeld Wolfen Chemie; DE 4201269 A 1993 CAPLUS
(2) Ici Plc; WO 9612758 A 1996 CAPLUS
(3) Londrigan, M; US 5308883 A 1994 CAPLUS
(4) Solvay Flour; WO 9614354 A 1996 CAPLUS
(5) Toyota Jidosha Kk; JP 02086631 A 1990 CAPLUS
(6) Wood, R; US 4595711 A 1986 CAPLUS

L15 ANSWER 74 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN

AN 1999:89460 CAPLUS

DN 130:140879

ED Entered STN: 11 Feb 1999

TI A modular design approach to calorimeters for developing and testing of
HCFC, HFC, and hydrocarbon compressors

AU Peeling, K. A.; Cranvey, D. M.

CS HEAT Technology Division, PA Hilton Limited, Stockbridge, UK

SO IMechE Seminar Publication (1998), (15, Design, Selection, and Operation
of Refrigerator and Heat Pump Compressors), 89-100
CODEN: ISEME4; ISSN: 1357-9193

PB Professional Engineering Publishing Ltd.

DT Journal

LA English

CC 47-8 (Apparatus and Plant Equipment)

AB This paper covers the development of a compressor calorimeter from a laboratory
scale refrigeration unit to the design and production of a com.
calorimeter for the testing of hermetic compressors in accordance with the
International Standard ISO 917. The approach used was a concept of modular
evaporator and condenser test sets. The computer-based data collection
and control techniques developed are detailed together with the
considerations for operation on CFC, HCFC, HFC and hydrocarbon
refrigerants. Also examined are the selection criteria of the appropriate X
and Y test techniques as detailed in ISO 917.

ST calorimeter compressor testing; HCFC compressor testing calorimeter; HFC
compressor testing calorimeter; hydrocarbon compressor testing calorimeter

IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)

(chlorofluorocarbons; modular design approach to calorimeters for developing and testing of HCFC and HFC and hydrocarbon compressors)

IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoro; modular design approach to calorimeters for developing and testing of HCFC and HFC and hydrocarbon compressors)

IT Calorimeters
Compressors
Lubricating greases
(modular design approach to calorimeters for developing and testing of HCFC and HFC and hydrocarbon compressors)

IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(modular design approach to calorimeters for developing and testing of HCFC and HFC and hydrocarbon compressors)

IT 74-98-6, R290, uses 75-10-5, R32, Refrigerant 75-28-5, R600a
75-45-6 75-46-7, R23 75-63-8, R13B1 75-69-4, R11, Refrigerant
75-71-8, R12, Refrigerant 75-72-9, R13, Refrigerant 76-13-1, R113
124-38-9, R744, uses 306-83-2, R123 354-33-6, R125
420-46-2, R143a 811-97-2, R134a 1717-00-6, R141b
7664-41-7, R717, uses 39432-81-0, R502 50815-73-1, R503 56275-41-3, R500 114240-35-6, R 507 133023-17-3, R410A 149437-06-9, R402A
149437-07-0, R403B 150743-07-0, R404A 158675-78-6, R407C
158675-79-7, R408A 174819-20-6, R411B 188653-05-6, R413A
RL: TEM (Technical or engineered material use); USES (Uses)
(modular design approach to calorimeters for developing and testing of HCFC and HFC and hydrocarbon compressors)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Anon; ANSI/ASHRAE 41.9-1988 A Standard Calorimeter test method for flow measurement of a volatile refrigerant
(2) Anon; BS 4434:1995 Specification for Safety and environmental aspects in the design, construction and installation of refrigeration appliances and systems
(3) Cranvey, D; COMADEM 96 1996
(4) Cranvey, D; COMADEM 97 1997
(5) Hundy, G; The Refrigeration Scroll Compressor and its Application 1997
(6) ISO; BS 3122 Part 1: 1990 1989, P917
(7) The Institute of Refrigeration; Code of Practice for the Minimisation of Refrigerant Emissions from Refrigeration Systems 1995

L15 ANSWER 75 OF 175 CAPLUS

AN 1999:42330 CAPLUS
DN 130:112046
ED Entered STN: 21 Jan 1999
TI Gas chromatographic retention parameters database for refrigerant mixture composition management

AU Bruno, Thomas J.; Bachmeyer, Gregory M.; Wertz, Kelly H.
CS Physical and Chemical Properties Division, Chemical Science and Technology Laboratory, National Institute of Standards and Technology, Boulder, CO, 80303, USA

SO International Journal of Refrigeration (1998), 21(8), 639-647
CODEN: IJRFDI; ISSN: 0140-7007
PB Elsevier Science Ltd.
DT Journal
LA English

CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 80

AB Composition management of mixed refrigerant systems is a challenging problem in the laboratory, manufacturing facilities, and large refrigeration machinery. The issue of composition management is especially critical for the maintenance of

machinery that utilizes zeotropic mixts. as working fluids. These are fluids in which the gas and liquid phases will generally have greatly different compns. While there are many anal. techniques available for laboratory and online analyses, gas chromatog. probably offers the greatest flexibility at the most reasonable cost. This paper describes a chromatog. database that provides for the identification of refrigerant components, and thereby facilitates composition management of zeotropic fluids. Prior to the description of the database a description is given of the basic theory of chromatog. retention parameters and the exptl. techniques used in their measurement.

ST refrigerant mixt gas chromatog retention parameter

IT Databases
Gas chromatography
Mixtures
Refrigerants
(gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 127-18-4, Tetrachloroethene, properties
RL: PRP (Properties)
(R-1110; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 359-29-5, Ethene, Trichlorofluoro-
RL: PRP (Properties)
(R-1111; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 79-35-6, 1,1-Dichloro-2,2-difluoroethene
RL: PRP (Properties)
(R-1112a; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 311-81-9, cis-1,2-Dichloro-1,2-difluoroethene
RL: PRP (Properties)
(R-1112c; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 381-71-5, trans-1,2-Dichloro-1,2-difluoroethene
RL: PRP (Properties)
(R-1112t; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 79-38-9, Chlorotrifluoroethene
RL: PRP (Properties)
(R-1113; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 79-01-6, properties
RL: PRP (Properties)
(R-1120; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 13245-53-9, cis-1,2-Dichloro-1-fluoroethene
RL: PRP (Properties)
(R-1121c; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 13245-54-0, trans-1,2-Dichloro-1-fluoroethene
RL: PRP (Properties)
(R-1121t; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 359-10-4, 2-Chloro-1,1-difluoroethene
RL: PRP (Properties)
(R-1122; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 359-08-0, Ethene, 2-Bromo-1,1-difluoro-
RL: PRP (Properties)
(R-1122B1; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 359-11-5, Trifluoroethene

RL: PRP (Properties)
(R-1123; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 75-35-4, 1,1-Dichloroethene, properties
RL: PRP (Properties)
(R-1130a; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 156-59-2, cis-1,2-Dichloroethene
RL: PRP (Properties)
(R-1130c; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 156-60-5, trans-1,2-Dichloroethene
RL: PRP (Properties)
(R-1130t; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 2317-91-1, 1-Chloro-1-fluoroethene
RL: PRP (Properties)
(R-1131a; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 75-38-7, 1,1-Difluoroethene
RL: PRP (Properties)
(R-1132a; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 76-13-1, 1,1,2-Trichlorotrifluoroethane
RL: PRP (Properties)
(R-113; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 354-58-5, 1,1,1-Trichlorotrifluoroethane
RL: PRP (Properties)
(R-113a; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 593-60-2, Bromoethene
RL: PRP (Properties)
(R-1140B1; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 75-02-5, Fluoroethene
RL: PRP (Properties)
(R-1141; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 76-14-2, 1,2-Dichlorotetrafluoroethane
RL: PRP (Properties)
(R-114; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 354-53-0, 1-Bromo-2-chlorotetrafluoroethane
RL: PRP (Properties)
(R-114B1; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 374-07-2, 1,1-Dichlorotetrafluoroethane
RL: PRP (Properties)
(R-114a; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 76-15-3
RL: PRP (Properties)
(R-115; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 354-64-3, Iodopentafluoroethane
RL: PRP (Properties)
(R-115I-1; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 76-16-4, Hexafluoroethane
RL: PRP (Properties)
(R-116; gas chromatog. retention parameters database for refrigerant

mixture composition management)
IT 75-69-4, Trichlorofluoromethane
RL: PRP (Properties)
(R-11; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 354-14-3, 1,1,2,2-Tetrachloro-1-fluoroethane
RL: PRP (Properties)
(R-121; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 354-21-2, 1,2,2-Trichloro-1,1-difluoroethane
RL: PRP (Properties)
(R-122; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 306-83-2, 2,2-Dichloro-1,1,1-trifluoroethane
RL: PRP (Properties)
(R-123; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 151-67-7
RL: PRP (Properties)
(R-123B1; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 354-23-4, 1,2-Dichloro-1,1,2-trifluoroethane
RL: PRP (Properties)
(R-123a; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 677-21-4, 3,3,3-Trifluoropropene
RL: PRP (Properties)
(R-1243b; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 2837-89-0, 2-Chloro-1,1,1,2-tetrafluoroethane
RL: PRP (Properties)
(R-124; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 354-33-6, Pentafluoroethane
RL: PRP (Properties)
(R-125; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 75-71-8, Dichlorodifluoromethane
RL: PRP (Properties)
(R-12; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 359-28-4, 1,1,2-Trichloro-2-fluoroethane
RL: PRP (Properties)
(R-131; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 811-95-0, 1,1,2-Trichloro-1-fluoroethane
RL: PRP (Properties)
(R-131a; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 1649-08-7, 1,2-Dichloro-1,1-difluoroethane
RL: PRP (Properties)
(R-132b; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 75-88-7, 2-Chloro-1,1,1-trifluoroethane
RL: PRP (Properties)
(R-133a; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 359-35-3, 1,1,2,2-Tetrafluoroethane
RL: PRP (Properties)
(R-134; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 811-97-2, 1,1,1,2-Tetrafluoroethane

RL: PRP (Properties)
(R-134a; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 75-72-9, Chlorotrifluoromethane
RL: PRP (Properties)
(R-13; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 2314-97-8, Iodotrifluoromethane
RL: PRP (Properties)
(R-13I,1; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 430-57-9, 1,2-Dichloro-1-fluoroethane
RL: PRP (Properties)
(R-141; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 1717-00-6, 1,1-Dichloro-1-fluoroethane
RL: PRP (Properties)
(R-141b; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 75-68-3, 1-Chloro-1,1-difluoroethane
RL: PRP (Properties)
(R-142b; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 430-66-0, 1,1,2-Trifluoroethane
RL: PRP (Properties)
(R-143; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 420-46-2, 1,1,1-Trifluoroethane
RL: PRP (Properties)
(R-143a; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 29759-38-4, Tetrafluoroethane
RL: PRP (Properties)
(R-14; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 624-72-6, 1,2-Difluoroethane
RL: PRP (Properties)
(R-152; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 75-37-6, 1,1-Difluoroethane
RL: PRP (Properties)
(R-152a; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 75-00-3
RL: PRP (Properties)
(R-160; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 353-36-6, Fluoroethane
RL: PRP (Properties)
(R-161; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 1599-41-3, 1,2,2-Trichloropentafluoropropane
RL: PRP (Properties)
(R-215aa; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 76-17-5, 1,2,3-Trichloropentafluoropropane
RL: PRP (Properties)
(R-215ba; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 661-97-2, 1,2-Dichlorohexafluoropropane
RL: PRP (Properties)
(R-216ba; gas chromatog. retention parameters database for refrigerant

mixture composition management)
IT 754-34-7, 1-Iodoheptafluoropropane
RL: PRP (Properties)
(R-217I-1; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 76-18-6, 2-Chloroheptafluoropropane
RL: PRP (Properties)
(R-217ba; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 422-85-5, 1-Bromo-heptafluoropropane
RL: PRP (Properties)
(R-217caB1; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 75-43-4, Dichlorofluoromethane
RL: PRP (Properties)
(R-21; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 422-56-0, 3,3-Dichloro-1,1,1,2,2-pentafluoropropane
RL: PRP (Properties)
(R-225ca; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 507-55-1, 1,3-Dichloro-1,1,2,2,3-pentafluoropropane
RL: PRP (Properties)
(R-225cb; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 431-63-0, 1,1,1,2,3,3-Hexafluoropropane
RL: PRP (Properties)
(R-226ea; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 2252-84-8, 1,1,1,2,2,3,3-Heptafluoropropane
RL: PRP (Properties)
(R-227ca; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane
RL: PRP (Properties)
(R-227ea; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 75-45-6, Chlorodifluoromethane
RL: PRP (Properties)
(R-22; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 690-39-1, 1,1,1,3,3,3-Hexafluoropropane
RL: PRP (Properties)
(R-236fa; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 75-46-7, Trifluoromethane
RL: PRP (Properties)
(R-23; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 338-75-0, 2,3-Dichloro-1,1,1-trifluoropropane
RL: PRP (Properties)
(R-243db; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 24270-66-4, 1,1,2,3,3-Pentafluoropropane
RL: PRP (Properties)
(R-245ca; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 1814-88-6, 1,1,1,2,2-Pentafluoropropane
RL: PRP (Properties)
(R-245cb; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 460-73-1, 1,1,1,3,3-Pentafluoropropane

RL: PRP (Properties)
(R-245fa; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 460-35-5, 3-Chloro-1,1,1-trifluoropropane
RL: PRP (Properties)
(R-253fb; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 40723-63-5, 1,1,2,2-Tetrafluoropropane
RL: PRP (Properties)
(R-254cb; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 102738-79-4, Propane, 2-Chloro-1,3-difluoro-
RL: PRP (Properties)
(R-262da; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 421-07-8, 1,1,1-Trifluoropropane
RL: PRP (Properties)
(R-263fb; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 594-20-7, 2,2-Dichloropropane
RL: PRP (Properties)
(R-270aa; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 78-87-5, 1,2-Dichloropropane
RL: PRP (Properties)
(R-270da; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 142-28-9, 1,3-Dichloropropane
RL: PRP (Properties)
(R-270fa; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 78-99-9, 1,1-Dichloropropane
RL: PRP (Properties)
(R-270fb; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 75-29-6, 2-Chloropropane
RL: PRP (Properties)
(R-280da; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 75-10-5, Difluoromethane
RL: PRP (Properties)
(R-32; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 74-87-3, Chloromethane, properties
RL: PRP (Properties)
(R-40; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 593-53-3, Fluoromethane
RL: PRP (Properties)
(R-41; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 425-82-1, Oxetane, Hexafluoro-
RL: PRP (Properties)
(R-CE 216; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 3822-68-2, Pentafluorodimethyl ether
RL: PRP (Properties)
(R-E 125; gas chromatog. retention parameters database for refrigerant mixture composition management)

IT 1691-17-4, Bis(difluoromethyl)ether
RL: PRP (Properties)
(R-E 134; gas chromatog. retention parameters database for refrigerant

mixture composition management)
IT 460-43-5, Ethane, 1,1,1-trifluoro-2-methoxy-
RL: PRP (Properties)
(R-E 143a; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 13838-16-9, 2-Chloro-1,1,2-trifluoroethyl difluoromethyl ether
RL: PRP (Properties)
(R-E 235ca2; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 26675-46-7, 1-Chloro-2,2,2-trifluoroethyl difluoromethyl ether
RL: PRP (Properties)
(R-E 235da1; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 57041-67-5, Difluoromethyl 1,2,2,2-Tetrafluoroethyl ether
RL: PRP (Properties)
(R-E 236ea1; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 1885-48-9, 2-(Difluoromethoxy)-1,1,1-trifluoroethane
RL: PRP (Properties)
(R-E 24fa1; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 627-42-9, 2-Chloroethyl methyl ether
RL: PRP (Properties)
(R-E 280; gas chromatog. retention parameters database for refrigerant mixture composition management)
IT 28523-86-6, Fluoromethyl-2,2,2-trifluoro-1-(trifluoromethyl)ethyl ether
RL: PRP (Properties)
(R-E 347; gas chromatog. retention parameters database for refrigerant mixture composition management)
RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

(1) Bruno, T; ASHRAE Transactions 1992, V98(2), P210
(2) Bruno, T; Anal Chem 1996, V68(8), P1347 CAPLUS
(3) Bruno, T; CRC Handbook for the Identification and Analysis of Alternative Refrigerants 1995
(4) Bruno, T; Chromatographic and Electrophoretic Methods 1991
(5) Bruno, T; J Chromatogr 1994, VA679, P123
(6) Bruno, T; J Chromatogr 1994, VA672, P149
(7) Bruno, T; J Chromatogr 1994, VA686, P245
(8) Bruno, T; J Chromatogr 1995, VA708, P293
(9) Bruno, T; J Chromatogr 1996, VA736, P175
(10) Bruno, T; J Chromatogr 1996, VA723, P325
(11) Budahegyi, M; J Chromatogr 1983, V271, P213 CAPLUS
(12) Ettre, L; Anal Chem 1964, V36(8), P31A
(13) Ettre, L; Chromatographia 1973, V6(11), P489 CAPLUS
(14) Ettre, L; J Chromatogr 1967, V30, P1 CAPLUS
(15) Evans, M; J Chromatogr 1989, V472, P93 CAPLUS
(16) Grob, R; Modern Practice of Gas Chromatography 3rd ed 1995
(17) Haken, J; Adv Chromatogr 1976, V8, P367
(18) Kovats, E; Helv Chim Acta 1968, V41, P1915
(19) Sprouse, J; Am Lab 1984, P54 CAPLUS
(20) Takacs, J; J Chromatogr Sci 1991, V29(9), P382 CAPLUS
(21) Vernon, F; Chromatographia 1983, V17(11), P597 CAPLUS

L15 ANSWER 76 OF 175 CAPLUS
AN 1998:707803 CAPLUS
DN 130:68338
ED Entered STN: 09 Nov 1998
TI Ternary blend HFC152a/HFC125/HFC134a as an alternative for CFC12
AU Chen, Lingshan; Guo, Jianxiang; Hu, Xiangming
CS Guangdong University of Technology, Canton, 510090, Peop. Rep. China
SO Zhileng Xuebao (1998), (3), 8-11

CODEN: CLHPDE; ISSN: 0253-4339
PB   Zhongguo Zhileng Xuehui
DT   Journal
LA   Chinese
CC   48-5 (Unit Operations and Processes)
AB   The refrigeration cycles of household refrigerators of
     21 pure and mixture refrigerants were calculated by theor. cycle anal. A
     ternary blend HFC152a/HFC125/HFC134a with zero ODP, nontoxicity, and
     incombustibility was proposed to replace CFC12 refrigerant.
ST   alternative refrigerant refrigeration cycle; HFC152a HFC125
     HFC134a blend alternative refrigerant
IT   Refrigerants
       Refrigeration
     Ternary mixtures
     Thermodynamic cycle
        (ternary blend HFC152a/HFC125/HFC134a as an alternative refrigerant for
        CFC12)
IT   74-98-6, Propane, uses 75-10-5, R32   75-37-6, HFC152a
     75-45-6, R22   75-68-3, R142b   75-71-8, CFC12   106-97-8, Butane, uses
     354-33-6, HFC125 420-46-2, R143a 811-97-2,
     HFC134a   7664-41-7, Ammonia, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (ternary blend HFC152a/HFC125/HFC134a as an alternative refrigerant for
        CFC12)

L15 ANSWER 77 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1998:565486 CAPLUS
DN   129:204669
OREF 129:41538h,41539a
ED   Entered STN: 07 Sep 1998
TI   Prediction of the thermal conductivity of pure refrigerants through an
     extended corresponding states model
AU   Scalabrin, G.; Garavello, L.; Camporese, R.
CS   Istituto di Fisica Tecnica, Universita di Padova, Padua, I-35131, Italy
SO   Proceedings of the International Refrigeration Conference at Purdue, 6th,
     West Lafayette, Indiana, July 23-26, 1996 (1996), 415-422. Editor(s):
     Braun, James E.; Groll, Eckhard A. Publisher: Purdue University, West
     Lafayette, Indiana.
     CODEN: 66PPAY
DT   Conference
LA   English
CC   48-5 (Unit Operations and Processes)
AB   An accurate evaluation of the thermophys. properties of refrigerants over
     wide ranges of pressure and temperature is necessary to predict the performance
     of possible alternatives to fully halogenated chlorofluorocarbons in
     refrigeration and heat pumping applications. The transport
     properties have, in fact, a very important part in the
     refrigeration plant heat exchangers design. An extended
     corresponding states (ECS) model for the prediction of the thermodn.
     properties of pure and mixed hydrocarbons was presented and more recently
     an implementation of ECS was proposed for the prediction of the transport
     properties of halocarbon refrigerants, integrating in it the former ECS
     thermodn. model. In the meantime the data availability of both thermodn.
     and transport properties of the alternative fluorocarbons has greatly
     increased. A parallel validation of the two integrated model is here
     developed for five HCF fluids. Considering the predictive nature of the
     model and the scattering of the exptl. data, the mean accuracy is good and
     satisfactory for the tech. application requirements.
ST   thermal cond refrigerant modeling; corresponding state model refrigerant
     thermal cond
IT   Corresponding states
     Refrigerants

Thermal conductivity
(prediction of thermal conductivity of pure refrigerants through extended corresponding states model)

IT 75-10-5, R32, Refrigerant 75-37-6, R152a 354-33-6, R125 420-46-2, R143a 811-97-2, R134a
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(prediction of thermal conductivity of pure refrigerants through extended corresponding states model)

RE.CNT 43 THERE ARE 43 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Assael, M; Int J Thermophysics 1993, V14(2), P183 CAPLUS
(2) Assael, M; Int J Thermophysics 1995, V16(4), P851 CAPLUS
(3) Blanke, W; Fluid Phase Equilibria 1992, V80, P179 CAPLUS
(4) Defibaugh, D; Fluid Phase Equilibria 1992, V80, P157 CAPLUS
(5) Ely, J; Advanced in Cryogenic Engineering 1990, V35, P1511 CAPLUS
(6) Ely, J; Ind Eng Chem Fund 1981, V20, P323 CAPLUS
(7) Ely, J; Ind Eng Chem Fund 1983, V22, P90 CAPLUS
(8) Ely, J; J Research NBS 1981, V86, P597 CAPLUS
(9) Fischer, G; Ind Eng Chem Fund 1970, V9(4), P537
(10) Fu, Y; Fluid Phase Equilibria 1995, V111, P273 CAPLUS
(11) Gallagher, J; NIST Reference Database 23, REFPROP, Version 4.01 1993
(12) Geller, V; Proc Int Conference I I R 1994, P403 CAPLUS
(13) Grebenkov, A; Proc Int Conference I I R 1994, P419 CAPLUS
(14) Gross, U; Int J Thermophysics 1992, V13(6), P957 CAPLUS
(15) Gross, U; Proc Int Conference I I R 1990-1991, P103 CAPLUS
(16) Hammerschimdt, U; Proc Twelfth Symp on Thermophysical Properties 1994
(17) Hirschfelder, J; Molecular Theory of Gases and Liquids 1954
(18) Huber, M; Fluid Phase Equilibria 1992, V80, P239 CAPLUS
(19) Huber, M; Fluid Phase Equilibria 1992, V80, P249 CAPLUS
(20) Huber, M; Int J Refrigeration 1994, V17(1), P18 CAPLUS
(21) Kim, S; Int J Thermophysics 1993, V14(4), P937 CAPLUS
(22) Laesecke, A; Fluid Phase Equilibria 1992, V80, P263 CAPLUS
(23) Leland, T; Ind Eng Chem 1968, V60(7), P15 CAPLUS
(24) Li, C; AIChE J 1976, V22, P927 CAPLUS
(25) Maezawa, Y; J Chem Eng Data 1990, V35, P225 CAPLUS
(26) Oguchi, K; Proc Twelfth Symp on Thermophysical Properties 1994
(27) Papadaki, M; Int J Thermophysics 1993, V14(6), P1215 CAPLUS
(28) Papadaki, M; Int J Thermophysics 1993, V14(2), P173 CAPLUS
(29) Perkins, R; Physica A 1991, V173, P332 CAPLUS
(30) Ro, S; Proc Twelfth Symp on Thermophysical Properties 1994
(31) Sato, T; J Chem Eng Data 1994, V39, P851 CAPLUS
(32) Shankland, I; Proc Int Conference I I R 1982-1988, P305
(33) Tanaka, Y; Int J Thermophysics 1991, V12(6), P949 CAPLUS
(34) Tanaka, Y; Proc Twelfth Symp on Thermophysical Properties 1994
(35) Tillner-Roth, R; J Chem Thermodynamics 1992, V24, P413 CAPLUS
(36) Tsvetkov, O; Proc Twelfth Symp on Thermophysical Properties 1994
(37) Tsvetkov, O; Proc Twelfth Symp on Thermophysical Properties 1994
(38) Ueno, Y; Nihon Kikai Gakkai Ronbunshu B 1991, V57, P309
(39) Widiatmo, J; J Chem Eng Data 1994, V39, P304 CAPLUS
(40) Wilson, L; Fluid Phase Equilibria 1992, V80, P167 CAPLUS
(41) Yata, J; Fluid Phase Equilibria 1992, V80, P287 CAPLUS
(42) Yata, J; Proc Twelfth Symp on Thermophysical Properties 1994
(43) Zhang, H; J Chem Eng Data 1995, V40, P887 CAPLUS

L15 ANSWER 78 OF 175 CAPLUS

AN 1998:388398 CAPLUS
DN 129:83602
OREF 129:17221a,17224a
ED Entered STN: 25 Jun 1998
TI Refrigerator oil based on polyvinyl ether compatible with a non-chlorine hydrofluorocarbon refrigerant

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IN   Sunaga, Takashi; Watanabe, Masato
PA   Sanyo Electric Co. Ltd, Japan
SO   Eur. Pat. Appl., 17 pp.
     CODEN: EPXXDW
DT   Patent
LA   English
IC   ICM  C10M107-24
     ICS  C10M169-04; C09K005-04
ICI  C10M169-04, C10M107-24, C10M129-10, C10M129-18, C10M133-22, C10M137-04;
     C10N040-30
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   EP 846749            A1    19980610    EP 1997-120882         19971127
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, LT, LV, FI, RO
     JP 10159734          A     19980616    JP 1996-317949         19961128
     JP 2001098290        A     20010410    JP 2000-252798         19961128
     SG 71066             A1    20000321    SG 1997-4159           19971127
     CN 1187603           A     19980715    CN 1997-122979         19971128
     CN 1119587           C     20030827
PRAI JP 1996-317949       A     19961128
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 EP 846749       ICM    C10M107-24
                 ICS    C10M169-04; C09K005-04
                 ICI    C10M169-04, C10M107-24, C10M129-10, C10M129-18,
                        C10M133-22, C10M137-04; C10N040-30
                 IPCI   C10M0107-24 [ICM,6]; C10M0169-04 [ICS,6]; C09K0005-04
                        [ICS,6]; C09K0005-00 [ICS,6,C*]; C10M0169-04 [ICI,6];
                        C10M0169-00 [ICI,6,C*]; C10M0107-24 [ICI,6];
                        C10M0107-00 [ICI,6,C*]; C10M0129-10 [ICI,6];
                        C10M0129-18 [ICI,6]; C10M0129-00 [ICI,6,C*];
                        C10M0133-22 [ICI,6]; C10M0133-00 [ICI,6,C*];
                        C10M0137-04 [ICI,6]; C10M0137-00 [ICI,6,C*];
                        C10N0040-30 [ICI,6]
                 IPCR   F04B0039-02 [I,C*]; F04B0039-02 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C10M0107-00 [I,C*];
                        C10M0107-24 [I,A]; C10M0169-00 [I,C*]; C10M0169-04
                        [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A];
                        F04C0029-00 [I,C*]; F04C0029-00 [I,A]; F04C0029-02
                        [I,C*]; F04C0029-02 [I,A]; F25B0001-00 [I,C*];
                        F25B0001-00 [I,A]; F25B0031-00 [N,C*]; F25B0031-00
                        [N,A]
                 ECLA   C09K005/04B4B; C10M171/00R; C10M107/24; C10M169/04
 JP 10159734     IPCI   F04B0039-02 [ICM,6]; C09K0005-04 [ICS,6]; C09K0005-00
                        [ICS,6,C*]; C10M0107-24 [ICS,6]; C10M0107-00
                        [ICS,6,C*]; F04C0029-02 [ICS,6]; F25B0001-00 [ICS,6];
                        C10N0020-00 [ICS,6]; C10N0020-02 [ICS,6]; C10N0040-30
                        [ICS,6]
                 IPCR   F04B0039-02 [I,C*]; F04B0039-02 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C10M0107-00 [I,C*];
                        C10M0107-24 [I,A]; C10M0169-00 [I,C*]; C10M0169-04
                        [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A];
                        F04C0029-00 [I,C*]; F04C0029-00 [I,A]; F04C0029-02
                        [I,C*]; F04C0029-02 [I,A]; F25B0001-00 [I,C*];
                        F25B0001-00 [I,A]; F25B0031-00 [N,C*]; F25B0031-00
                        [N,A]
 JP 2001098290   IPCI   C10M0169-04 [ICM,7]; C10M0169-00 [ICM,7,C*];
                        C10M0107-24 [ICS,7]; C10M0107-00 [ICS,7,C*];
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C10M0129-10 [ICS,7]; C10M0129-18 [ICS,7]; C10M0129-00 [ICS,7,C*]; C10M0133-16 [ICS,7]; C10M0133-00 [ICS,7,C*]; F25B0001-00 [ICS,7]; C10N0020-00 [ICS,7]; C10N0020-02 [ICS,7]; C10N0030-00 [ICS,7]; C10N0030-10 [ICS,7]; C10N0040-30 [ICS,7]

SG 71066	IPCI	C10M0107-24 [ICM,7]; C10M0107-00 [ICM,7,C*]
	IPCR	F04B0039-02 [I,C*]; F04B0039-02 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0107-00 [I,C*]; C10M0107-24 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; F04C0029-00 [I,C*]; F04C0029-00 [I,A]; F04C0029-02 [I,C*]; F04C0029-02 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]; F25B0031-00 [N,C*]; F25B0031-00 [N,A]
CN 1187603	IPCI	F25B0001-02 [ICM,6]; C09K0005-04 [ICS,6]; C09K0005-00 [ICS,6,C*]
	IPCR	F04B0039-02 [I,C*]; F04B0039-02 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0107-00 [I,C*]; C10M0107-24 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; F04C0029-00 [I,C*]; F04C0029-00 [I,A]; F04C0029-02 [I,C*]; F04C0029-02 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]; F25B0031-00 [N,C*]; F25B0031-00 [N,A]

AB An object of the present invention is to obtain a good refrigerator using polyvinyl ether oil as a refrigerator oil, which is compatible with a hydrofluorocarbon-type refrigerant not containing chlorine (such as R134a) without suffering conventional problems. A refrigerator of the present invention comprises a refrigerating cycle using a hydrofluorocarbon type refrigerant not containing chlorine or a refrigerant mixture thereof, with a refrigerator oil compatible with the refrigerant sealed. The refrigerator oil comprises mainly a polyvinyl ether-type compound having a repeating structural unit of formula: -[C(R1)(R2)C(R3)(OR4)]n-, in which n = an integer of ≥1; R1-3 = H or C1-8 hydrocarbyl; R4 = C1-4 alkyl. The polyvinyl ether-type compound preferably has a pour point of ≤-40°, a two-liquid separation temperature of ≤-20°, a total acid number of ≤0.02 mg KOH/g, a kinematic viscosity of 8-100 cSt at ≤40°, and a viscosity index of ≥80.

ST polyvinyl ether refrigerator oil

IT Refrigerants
(refrigerator oil based on polyvinyl ether compatible with a non-chlorine hydrofluorocarbon refrigerant)

IT 75-10-5, R32 354-33-6, R125 420-46-2, R143a 811-97-2, R134a 9003-19-4, Polyvinyl ether
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerator oil based on polyvinyl ether compatible with a non-chlorine hydrofluorocarbon refrigerant)

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Egawa, T; US 5518643 A CAPLUS
(2) Idemitsu Kosan Co; WO 9728236 A CAPLUS
(3) Idemitsu Kosan Company; EP 0732391 A CAPLUS
(4) Idemitsu Kosan Company Limited; EP 0644175 A CAPLUS
(5) Kaneko, M; US 5454963 A CAPLUS
(6) Sanyo Electric Co; EP 0715079 A CAPLUS

L15 ANSWER 79 OF 175 CAPLUS
AN 1998:352193 CAPLUS
DN 129:83110
OREF 129:17133a,17136a
ED Entered STN: 10 Jun 1998

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TI   Refrigerator using alternatives for chlorofluorocarbons as
     coolants and coolant compressor
IN   Egawa, Tatsuya; Yamazaki, Hirotaka; Mogami, Kenji; Nagao, Akira; Handa,
     Toyokazu; Kaneko, Masato
PA   Idemitsu Kosan Co., Ltd., Japan
SO   Jpn. Kokai Tokkyo Koho, 17 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C08L029-10
     ICS  C08K005-02; C08K005-06
CC   47-4 (Apparatus and Plant Equipment)
     Section cross-reference(s): 38, 51
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   JP 10147682          A     19980602    JP 1996-306621         19961118
     JP 3501258           B2    20040302
PRAI JP 1996-306621             19961118
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 JP 10147682     ICM    C08L029-10
                 ICS    C08K005-02; C08K005-06
                 IPCI   C08L0029-10 [ICM,6]; C08K0005-02 [ICS,6]; C08K0005-06
                        [ICS,6]
                 IPCR   C08K0005-00 [I,C*]; C08K0005-02 [I,A]; C08K0005-06
                        [I,A]; C08L0029-00 [I,C*]; C08L0029-10 [I,A];
                        C10M0107-00 [I,C*]; C10M0107-24 [I,A]; C10M0107-34
                        [I,A]; C10N0020-02 [N,A]; C10N0030-00 [N,A];
                        C10N0040-30 [N,A]; F25B0001-00 [I,C*]; F25B0001-00
                        [I,A]
AB   The apparatus has compressors, condensers, a means of expansion, and
     evaporators and uses hydrofluorocarbon-, fluorocarbon-, hydrocarbon-,
     ether-, CO2-, or NH3-based coolants and poly(vinyl ether)-based lubricant
     oils with dynamic viscosity 2-200 mm2/s at 40°.  A sealed
     refrigerant compressor comprising a compressor and a motor in one
     container with high or low inner pressure is also claimed.  The poly(vinyl
     ether)-based lubricants show good compatibility to the coolants.
ST   refrigerator chlorofluorocarbon free coolant compatible
     lubricant; polyvinyl ether lubricant oil refrigerator;
     hydrofluorocarbon coolant refrigerator polyvinyl ether
     lubricant; fluorocarbon coolant refrigerator polyvinyl ether
     lubricant; hydrocarbon coolant refrigerator polyvinyl ether
     lubricant; ether coolant refrigerator polyvinyl ether lubricant;
     carbon dioxide coolant refrigerator compatible lubricant;
     ammonia coolant refrigerator compatible lubricant
IT   Compressors
        (coolant compressors using chlorofluorocarbon coolant alternatives and
        compatible poly(vinyl ether) lubricants)
IT   Polyesters, uses
     Polyesters, uses
     Polyethers, uses
     Polythiophenylenes
     RL: DEV (Device component use); TEM (Technical or engineered material
     use); USES (Uses)
        (crystalline, elec. insulators on wires in motors; in refrigerators
        using chlorofluorocarbon coolant alternatives and compatible poly(vinyl
        ether) lubricants)
IT   Zeolites (synthetic), uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (dryer; refrigerators using chlorofluorocarbon coolant
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alternatives and compatible poly(vinyl ether) lubricants)
IT Polyamides, uses
Polyimides, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(elec. insulators on wires in motors; in refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT Nitrile rubber, uses
RL: DEV (Device component use); USES (Uses)
(hydrogenated, vibration dampers; in refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT Gaskets
Vibration dampers
(in refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT Electric insulators
Enamels (vitreous)
Varnishes
(on wires in motors; in refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT Polyimides, uses
Polyimides, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(polyamide-, elec. insulators on wires in motors; in refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT Polyimides, uses
Polyimides, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(polyester-, elec. insulators on wires in motors; in refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT Polyketones
Polyketones
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(polyether-, crystalline, elec. insulators on wires in motors; in refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT Polyamides, uses
Polyamides, uses
Polyesters, uses
Polyesters, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(polyimide-, elec. insulators on wires in motors; in refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT Polyethers, uses
Polyethers, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(polyketone-, crystalline, elec. insulators on wires in motors; in refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT Coolants
Lubricants

Refrigerating apparatus
(refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT   EPDM rubber
Fluoro rubber
Nitrile rubber, uses
Silicone rubber, uses
RL: DEV (Device component use); USES (Uses)
(vibration dampers; in refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT   75-10-5, R 32   124-38-9, Carbon dioxide, uses 354-33-6, Pentafluoroethane 420-46-2, 1,1,1-Trifluoroethane
811-97-2, R 134a   7664-41-7, Ammonia, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(coolant; refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT   9020-32-0, Poly(ethylene naphthalate)   9020-73-9   24968-12-5, Poly(butylene terephthalate)   25038-59-9, PET (polyester), uses
26062-94-2, Poly(butylene terephthalate)
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(crystalline, elec. insulators on wires in motors; in refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT   25104-37-4, Poly(ethyl vinyl ether)
RL: TEM (Technical or engineered material use); USES (Uses)
(lubricant; refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT   9003-09-2, Poly(methyl vinyl ether)   25585-49-3, Poly(isopropyl vinyl ether)   28390-31-0   30399-62-3, Ethyl vinyl ether-isobutyl vinyl ether copolymer
RL: TEM (Technical or engineered material use); USES (Uses)
(lubricants; refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT   9003-18-3
RL: DEV (Device component use); USES (Uses)
(nitrile rubber, hydrogenated, vibration dampers; in refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)
IT   9003-18-3
RL: DEV (Device component use); USES (Uses)
(nitrile rubber, vibration dampers; in refrigerators using chlorofluorocarbon coolant alternatives and compatible poly(vinyl ether) lubricants)

L15 ANSWER 80 OF 175 CAPLUS
AN   1998:333879 CAPLUS
DN   129:83616
OREF 129:17221a,17224a
ED   Entered STN: 04 Jun 1998
TI   Refrigerating apparatus
IN   Mishina, Shotaro; Hara, Hideki; Ishia, Akira
PA   Daikin Industries, Ltd., Japan
SO   Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM C10M171-00
ICS C09K005-04; F25B001-00; C10N040-30
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE

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PI   JP 10130685          A     19980519    JP 1996-288419         19961030
PRAI JP 1996-288419             19961030
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
 --------------  -----  ----------------------------------------------
 JP 10130685     ICM    C10M171-00
                 ICS    C09K005-04; F25B001-00; C10N040-30
                 IPCI   C10M0171-00 [ICM,6]; C09K0005-04 [ICS,6]; F25B0001-00
                        [ICS,6]; C10N0040-30 [ICS,6]
                 IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C10M0171-00 [I,C*];
                        C10M0171-00 [I,A]; C10N0040-30 [N,A]
AB   A refrigerating apparatus comprised of a refrigeration
     cycle containing cyclically connected compressor, condenser, throttling
     device, and evaporator uses hydrocarbon refrigerants and lubricating oils
     compatible with the hydrocarbon refrigerants.  The apparatus provides improved
     refrigeration capacity for refrigeration systems and
     prevents the global warming.
ST   refrigeration cycle refrigerant hydrocarbon lubricating oil
IT   Lubricating oils
     Refrigerants
       Refrigerating apparatus
       Refrigeration
        (refrigerating apparatus using hydrocarbon refrigerants and
        lubricating oils compatible with them)
IT   Naphthenic oils
     Paraffin oils
     RL: NUU (Other use, unclassified); TEM (Technical or engineered material
     use); USES (Uses)
        (refrigerating apparatus using hydrocarbon refrigerants and
        lubricating oils compatible with them)
IT   74-82-8, Methane, uses   74-84-0, Ethane, uses   74-85-1, Ethene, uses
     74-98-6, Propane, uses 75-10-5, HFC 32   75-19-4, Cyclopropane
     75-28-5   75-37-6, HFC 152a   75-46-7, HFC 23   78-78-4   106-97-8,
     n-Butane, uses   109-66-0, n-Pentane, uses   115-07-1, 1-Propene, uses
     287-23-0, Cyclobutane   287-92-3, Cyclopentane 354-33-6, HFC 125
     420-46-2, HFC 143a 811-97-2, HFC 134a   7664-41-7,
     Ammonia, uses
     RL: NUU (Other use, unclassified); TEM (Technical or engineered material
     use); USES (Uses)
        (refrigerant; refrigerating apparatus using hydrocarbon
        refrigerants and lubricating oils compatible with them)

L15  ANSWER 81 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1998:236466  CAPLUS
DN   128:322354
OREF 128:63899a,63902a
ED   Entered STN:  25 Apr 1998
TI   Refrigerant-resistant resin compositions with excellents heat and
     hydrolysis resistance, moldability, and durability, sealants therefrom,
     and refrigerant compressors using the same
IN   Tanaka, Mitsuru
PA   NTN Corp., Japan
SO   Jpn. Kokai Tokkyo Koho, 13 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C08L079-08
     ICS  F04C018-02; C08L079-08; C08L067-00; C08L027-12; C08K003-04
CC   37-6 (Plastics Manufacture and Processing)
     Section cross-reference(s): 42
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FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 10101930	A	19980421	JP 1996-259453	19960930
PRAI	JP 1996-259453		19960930		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 10101930	ICM	C08L079-08
	ICS	F04C018-02; C08L079-08; C08L067-00; C08L027-12; C08K003-04
	IPCI	C08L0079-08 [ICM,6]; F04C0018-02 [ICS,6]; C08L0079-08 [ICS,6]; C08L0067-00 [ICS,6]; C08L0027-12 [ICS,6]; C08K0003-04 [ICS,6]
	IPCR	F04C0018-02 [I,C*]; F04C0018-02 [I,A]; C08L0079-00 [I,C*]; C08L0079-08 [I,A]

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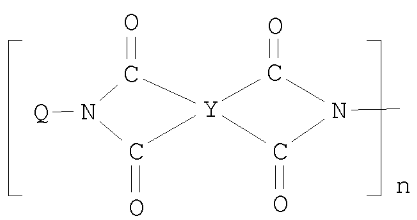

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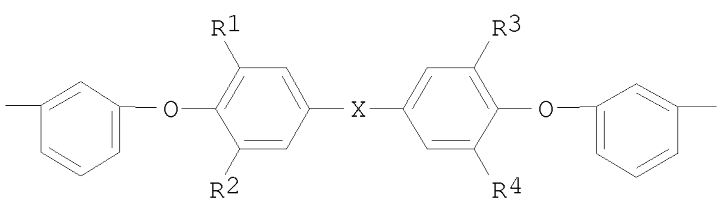
Q = 

AB The title compns. are based on polyimides I, where X = direct bond, C1-10 hydrocarbylene, hexafluoroisopropylidene, CO, S, O, SO2; R1-4 = H, C1-6 alkyl, alkoxy, Cl, Br; Y = tetravalent C2-27 aliphatic, alicyclic, aromatic, bridged aromatic group. A composition comprised Aurum 450 polyimide 100, Sumika Super E5000 liquid-crystalline polyester 6, M107T carbon fiber 13, and KT400H PTFE 6 parts.

ST polyimide sealant refrigerant resistant; heat water resistant polyimide sealant; refrigerator compressor sealant

IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoro; refrigerant-resistant resin compns. with excellents heat and hydrolysis resistance, moldability, and durability, sealants therefrom, and refrigerant compressors using the same)

IT Polyketones
Polyketones
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(polyether-; refrigerant-resistant resin compns. with excellents heat and hydrolysis resistance, moldability, and durability, sealants therefrom, and refrigerant compressors using the same)

IT Polyethers, uses

Polyethers, uses
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(polyketone-; refrigerant-resistant resin compns. with excellents heat and hydrolysis resistance, moldability, and durability, sealants therefrom, and refrigerant compressors using the same)

IT Compressors
Liquid crystals, polymeric
Refrigerants
Refrigerating apparatus
Sealing compositions
(refrigerant-resistant resin compns. with excellents heat and hydrolysis resistance, moldability, and durability, sealants therefrom, and refrigerant compressors using the same)

IT Polymer blends
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(refrigerant-resistant resin compns. with excellents heat and hydrolysis resistance, moldability, and durability, sealants therefrom, and refrigerant compressors using the same)

IT Fluoropolymers, uses
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(refrigerant-resistant resin compns. with excellents heat and hydrolysis resistance, moldability, and durability, sealants therefrom, and refrigerant compressors using the same)

IT Polyesters, uses
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(refrigerant-resistant resin compns. with excellents heat and hydrolysis resistance, moldability, and durability, sealants therefrom, and refrigerant compressors using the same)

IT Polyimides, uses
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(refrigerant-resistant resin compns. with excellents heat and hydrolysis resistance, moldability, and durability, sealants therefrom, and refrigerant compressors using the same)

IT 9002-84-0, KT400H 31694-16-3, Victrex PEEK150P 81843-52-9, Vectra A950 105359-94-2, Aurum 450 191045-09-7, Sumika Super E5000
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)
(refrigerant-resistant resin compns. with excellents heat and hydrolysis resistance, moldability, and durability, sealants therefrom, and refrigerant compressors using the same)

IT 75-10-5, Difluoromethane 75-37-6, 1,1-Difluoroethane 354-33-6, Pentafluoroethane 420-46-2, 1,1,1-Trifluoroethane 811-97-2, 1,1,1,2-Tetrafluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerant-resistant resin compns. with excellents heat and hydrolysis resistance, moldability, and durability, sealants therefrom, and refrigerant compressors using the same)

L15 ANSWER 82 OF 175 CAPLUS
AN 1998:217503 CAPLUS
DN 128:259426
OREF 128:51319a,51322a
ED Entered STN: 17 Apr 1998
TI Refrigeration compressor and cooling apparatus comprising the same
IN Sunaga, Takashi; Watanabe, Masato; Ishikawa, Kazuhisa; Ando, Kenji; Okajima, Masazo; Obokata, Yoshinobu; Takahashi, Yasuki

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PA   Sanyo Electric Co., Ltd., Japan
SO   Eur. Pat. Appl., 20 pp.
     CODEN: EPXXDW
DT   Patent
LA   English
IC   ICM  C10M107-24
     ICS  C10M169-04; C09K005-04
ICI  C10M169-04, C10M107-24, C10M129-10, C10M129-18, C10M133-22, C10M137-04;
     C10N040-30
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
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PI   EP 832961            A2    19980401    EP 1997-116911         19970929
     EP 832961            A3    19980422
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, LT, LV, FI, RO
     JP 10103279          A     19980421    JP 1996-259641         19960930
     JP 3557053           B2    20040825
     JP 2001089777        A     20010403    JP 2000-252797         19960930
     SG 72761             A1    20000523    SG 1997-3611           19970929
     CN 1492032           A     20040428    CN 2003-2003127574     19970930
PRAI JP 1996-259641       A     19960930
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 EP 832961       ICM    C10M107-24
                 ICS    C10M169-04; C09K005-04
                 ICI    C10M169-04, C10M107-24, C10M129-10, C10M129-18,
                        C10M133-22, C10M137-04; C10N040-30
                 IPCI   C10M0107-24 [ICM,6]; C10M0169-04 [ICS,6]; C09K0005-04
                        [ICS,6]; C09K0005-00 [ICS,6,C*]; C10M0169-04 [ICI,6];
                        C10M0169-00 [ICI,6,C*]; C10M0107-24 [ICI,6];
                        C10M0107-00 [ICI,6,C*]; C10M0129-10 [ICI,6];
                        C10M0129-18 [ICI,6]; C10M0129-00 [ICI,6,C*];
                        C10M0133-22 [ICI,6]; C10M0133-00 [ICI,6,C*];
                        C10M0137-04 [ICI,6]; C10M0137-00 [ICI,6,C*];
                        C10N0040-30 [ICI,6]
                 IPCR   F04C0029-02 [I,C*]; F04C0029-02 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C10M0107-00 [I,C*];
                        C10M0107-24 [I,A]; C10M0169-00 [I,C*]; C10M0169-04
                        [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A];
                        C10N0040-30 [N,A]; F04C0029-00 [I,C*]; F04C0029-00
                        [I,A]; F25B0031-00 [I,C*]; F25B0031-00 [I,A]
                 ECLA   C09K005/04B4B; C10M107/24; C10M169/04; C10M171/00R;
                        F25B031/00B
 JP 10103279     IPCI   F04C0029-02 [ICM,6]; C10M0107-24 [ICS,6]; C10M0107-00
                        [ICS,6,C*]; C10N0040-30 [ICS,6]
                 IPCR   F04C0029-02 [I,C*]; F04C0029-02 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C10M0107-00 [I,C*];
                        C10M0107-24 [I,A]; C10M0169-00 [I,C*]; C10M0169-04
                        [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A];
                        C10N0040-30 [N,A]; F04C0029-00 [I,C*]; F04C0029-00
                        [I,A]; F25B0031-00 [I,C*]; F25B0031-00 [I,A]
 JP 2001089777   IPCI   C10M0107-24 [ICM,7]; C10M0107-00 [ICM,7,C*];
                        F25B0001-00 [ICS,7]; C10N0020-00 [ICS,7]; C10N0030-08
                        [ICS,7]; C10N0040-30 [ICS,7]
 SG 72761        IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*];
                        C10M0010-24 [ICS,7]; C10M0169-04 [ICS,7]; C10M0169-00
                        [ICS,7,C*]; F04C0029-02 [ICS,7]; C10N0040-30 [ICI,7]
                 IPCR   F04C0029-02 [I,C*]; F04C0029-02 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C10M0107-00 [I,C*];
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C10M0107-24 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0040-30 [N,A]; F04C0029-00 [I,C*]; F04C0029-00 [I,A]; F25B0031-00 [I,C*]; F25B0031-00 [I,A]

CN 1492032 IPCI C10M0105-20 [ICM,7]; C10M0105-00 [ICM,7,C*]; C09K0005-04 [ICS,7]; C09K0005-00 [ICS,7,C*]

AB A refrigeration compressor is configured such that a compressor unit is installed in a hermetically sealed container, an HFC type refrigerant or a mixture thereof and a refrigerator oil having compatibility with the refrigerant are charged into the hermetically sealed container, and the refrigerator oil essentially comprises a polyvinyl ether type compound having structural units represented by the following general formula [CR1R2C(R3)(OR4)]n, wherein n is an integral number in the range of ≥1, R1 to R3 are each a hydrogen atom or a hydrocarbon group having 1 to 8 carbon atoms and may be the same or different, R4 is an alkyl group having 1 to 4 carbon atoms, and units in which R4 is an alkyl group having 1 to 2 carbon atoms are 40 to 100 % and units in which R4 is an alkyl group having 3 to 4 carbon atoms are 0 to 60 %. As a result, the generation of a carboxylic acid caused by thermal cracking or hydrolysis due to frictional heat generated by sliding members is prevented and the generation of sludge is thereby suppressed.

ST refrigerator compressor refrigerant compn

IT Refrigerants
(HFC-type; refrigeration compressor and cooling apparatus comprising the same)

IT Hydrocarbons, uses
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(fluoro, refrigerants; refrigeration compressor and cooling apparatus comprising the same)

IT Lubricating oils
(polyvinyl ethers; refrigeration compressor and cooling apparatus comprising the same)

IT Compressors
Refrigerating apparatus
(refrigeration compressor and cooling apparatus comprising the same)

IT Tools
(vane made of high-speed steel; refrigeration compressor and cooling apparatus comprising the same)

IT 811-97-2, R 134a 133023-17-3, R 410A 150743-07-0, R 404A 158675-78-6, R 407C
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(refrigerant; refrigeration compressor and cooling apparatus comprising the same)

IT 75-10-5, R 32 354-33-6, R 125 420-46-2, R 143a
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(refrigerants containing; refrigeration compressor and cooling apparatus comprising the same)

IT 1330-78-5, Tricresyl phosphate 2461-15-6, 2-Ethylhexyl glycidyl ether
RL: MOA (Modifier or additive use); USES (Uses)
(refrigerator oils containing; refrigeration compressor and cooling apparatus comprising the same)

IT 205380-59-2
RL: DEV (Device component use); USES (Uses)
(roller made of; refrigeration compressor and cooling apparatus comprising the same)

IT 12597-69-2, Steel, uses 205380-56-9 205380-57-0 205380-58-1
RL: DEV (Device component use); USES (Uses)
(vane made of; refrigeration compressor and cooling apparatus

comprising the same)

L15 ANSWER 83 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1998:89293 CAPLUS
DN 128:128739
OREF 128:25289a,25292a
ED Entered STN: 16 Feb 1998
TI Manufacture of closed-cell polyurethane or polyisocyanurate polymer foams
IN Creazzo, Joseph Anthony; Hammel, Howard S.
PA E. I. Du Pont de Nemours & Co., USA; Creazzo, Joseph Anthony; Hammel, Howard S.
SO PCT Int. Appl., 28 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C08J009-14
ICS C08L075-04
CC 37-6 (Plastics Manufacture and Processing)
FAN.CNT 3

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9803580	A1	19980129	WO 1997-US13073	19970723
	W: AL, AM, AU, AZ, BA, BB, BG, BR, BY, CA, CN, CU, CZ, EE, GE, HU, IL, IS, JP, KG, KP, KR, KZ, LC, LK, LR, LT, LV, MD, MG, MK, MN, MX, NO, NZ, PL, RO, RU, SG, SI, SK, SL, TJ, TM, TR, TT, UA, US, UZ, VN, YU				
	RW: GH, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
	CA 2260868	A1	19980129	CA 1997-2260868	19970723
	AU 9738943	A	19980210	AU 1997-38943	19970723
	EP 914369	A1	19990512	EP 1997-936223	19970723
	EP 914369	B1	20030514		
	R: DE, FR, GB, IT, NL				
	BR 9710510	A	19990817	BR 1997-10510	19970723
	US 6121337	A	20000919	US 1997-898980	19970723
	JP 2000515196	T	20001114	JP 1998-507234	19970723
PRAI	US 1996-22574P	P	19960724		
	US 1990-500051	B1	19900323		
	US 1990-577045	B1	19900828		
	US 1991-702282	B1	19910628		
	US 1992-973599	A1	19921109		
	US 1995-427643	A1	19950424		
	US 1996-627520	A2	19960404		
	WO 1997-US13073	W	19970723		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 9803580	ICM	C08J009-14
	ICS	C08L075-04
	IPCI	C08J0009-14 [ICM,6]; C08J0009-00 [ICM,6,C*]; C08L0075-04 [ICS,6]; C08L0075-00 [ICS,6,C*]
	IPCR	C08G0018-00 [I,C*]; C08G0018-28 [I,A]; C08G0101-00 [N,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]
	ECLA	C08J009/14H2F+L75/04
CA 2260868	IPCI	C08J0009-14 [ICM]; C08J0009-00 [ICM,C*]; C08L0075-04 [ICS]; C08L0075-00 [ICS,C*]
	IPCR	C08G0018-00 [I,C*]; C08G0018-28 [I,A]; C08G0101-00 [N,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]
AU 9738943	IPCI	C08J0009-14 [ICM,6]; C08J0009-00 [ICM,6,C*]; C08L0075-04 [ICS,6]; C08L0075-00 [ICS,6,C*]

IPCR C08G0018-00 [I,C*]; C08G0018-28 [I,A]; C08G0101-00 [N,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]

EP 914369 IPCI C08J0009-14 [ICM,6]; C08J0009-00 [ICM,6,C*]; C08L0075-04 [ICI,6]; C08L0075-00 [ICI,6,C*]

IPCR C08G0018-00 [I,C*]; C08G0018-28 [I,A]; C08G0101-00 [N,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]

BR 9710510 IPCI C08J0009-14 [ICM,6]; C08J0009-00 [ICM,6,C*]

IPCR C08G0018-00 [I,C*]; C08G0018-28 [I,A]; C08G0101-00 [N,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]

US 6121337 IPCI C08J0009-14 [ICM,7]; C08J0009-00 [ICM,7,C*]

IPCR C08J0009-00 [I,C*]; C08J0009-14 [I,A]

NCL 521/131.000; 521/137.000; 521/155.000; 521/170.000; 521/172.000; 521/174.000

ECLA C08J009/14H2F

JP 2000515196 IPCI C08G0018-28 [ICM,7]; C08J0009-14 [ICS,7]; C08J0009-00 [ICS,7,C*]; C08G0018-28 [ICS,7]; C08G0018-00 [ICS,7,C*]; C08G0101-00 [ICS,7]

IPCR C08G0018-00 [I,C*]; C08G0018-28 [I,A]; C08G0101-00 [N,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]

AB The title foams are prepared by reacting an isocyanate-containing component with an active H-containing component having ≥2 active H in the presence of a blowing agent comprising HFC-134 dissolved in the active H-containing component and forming the foams in conventional apparatus using fluorotrichloromethane blowing agent. Also disclosed are blowing agent blend, foaming process and polyisocyanate-based foams which utilize environmentally friendly blowing agent compns. comprising a major proportion of HFC-134.

ST blowing agent polyisocyanurate polyurethane foam

IT Hydrocarbons, uses
RL: NUU (Other use, unclassified); USES (Uses)
(fluoro; manufacture of closed-cell polyurethane or polyisocyanurate polymer foams)

IT Blowing agents
(manufacture of closed-cell polyurethane or polyisocyanurate polymer foams)

IT Polyisocyanurates
Polyurethanes, preparation
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(manufacture of closed-cell polyurethane or polyisocyanurate polymer foams)

IT Polyurethanes, preparation
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(polyester-; manufacture of closed-cell polyurethane or polyisocyanurate polymer foams)

IT Polyesters, preparation
Polyoxyalkylenes, preparation
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(polyols, polyurethanes; manufacture of closed-cell polyurethane or polyisocyanurate polymer foams)

IT 57-50-1DP, Sucrose, polyether polyols, polyurethanes 101-68-8DP, MDI, polyurethanes 25038-59-9DP, PET polymer, polyols, polyurethanes 25322-69-4DP, Polypropylene glycol, polyols, polyurethanes
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(manufacture of closed-cell polyurethane or polyisocyanurate polymer

foams)
IT   75-10-5, HFC 32   75-37-6, HFC 152a 354-33-6, HFC 125
     359-35-3, HFC 134 420-46-2, HFC 143a 811-97-2, HFC
     134a
     RL: NUU (Other use, unclassified); USES (Uses)
        (manufacture of closed-cell polyurethane or polyisocyanurate polymer
        foams)
RE.CNT 2   THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Dow Chemical Co; WO 9112289 A 1991 CAPLUS
(2) Du Pont; WO 9217558 A 1992 CAPLUS

L15 ANSWER 84 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1998:59258 CAPLUS
DN   128:77022
OREF 128:15043a,15046a
ED   Entered STN: 31 Jan 1998
TI   Results of soft-optimized system tests in ARI's R-22 alternative
     refrigerants evaluation program
AU   Godwin, David S.
CS   Res. Projects Eng. and Res. Air-Conditioning and Refrigeration Inst.,
     Arlington, VA, 22203, USA
SO   Intersociety Cryogenic Symposium, 10th, Houston, Mar. 20-23, 1995 (1995),
     361-383. Editor(s): Cousins, Mary C. Publisher: American Institute of
     Chemical Engineers, New York, N. Y.
     CODEN: 65NBA9
DT   Conference
LA   English
CC   48-5 (Unit Operations and Processes)
AB   The phase-out of the production of HCFC-22 (a hydrochlorofluorocarbon) and R-502 (a mixture of HCFC-22 and CFC-115), currently scheduled for the year 2020 and 1996, resp., will require manufacturers of air-conditioning and refrigeration equipment to find suitable alternatives for these widely-used refrigerants. The Alternative Refrigerants Evaluation Program (AREP) was established by the Air-Conditioning and Refrigeration Institute (ARI) to assist manufacturers in obtaining performance data on a multitude of HCFC-22 and R-502 alternatives. This purpose has been met, and the AREP effort is now entering a new phase focusing on the implementation of new chlorine-free refrigerants. The testing program established under AREP is described. Steps include testing alternative refrigerants in compressors as well as in unmodified systems, and testing standard systems modified for use with a given alternative refrigerant. Results from these compressor calorimeter and system drop-in test are referenced, and results from soft-optimized system tests are discussed. Several alternatives are found to perform almost as well, and sometimes better than the baseline refrigerant. No single alternative appears as a universal replacement for either HCFC-22 or R-502. Several more issues face manufacturers as they try to implement some of the alternative refrigerants originally teted under AREP. These issues are also discussed.
ST   R 22 alternative evaluation; R 502 alternative evaluation; refrigerant
     alternative evaluation
IT   Refrigerants
     Testing of materials
        (soft-optimized system testing of R-22 and R-502 alternative
        refrigerants)
IT   354-33-6, R-125
     RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical
     process); PROC (Process); USES (Uses)
        (soft-optimized system testing of R-125 as R-22 and R-502 alternative
        refrigerants)
IT   811-97-2, R-134a

RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(soft-optimized system testing of R-134a as R-22 and R-502 alternative refrigerants)
IT 420-46-2, R-143a
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(soft-optimized system testing of R-143a as R-502 alternative refrigerants)
IT 75-46-7, R-23
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(soft-optimized system testing of R-23 as R-502 alternative refrigerants)
IT 75-10-5, R 32
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(soft-optimized system testing of R-32 as R-22 and R-502 alternative refrigerants)
RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Anon; Results from ARI's R-22 Alternative Refrigerants Evaluation Program (AREP): Volumes 1-4 (Compressor Calorimeter, System Drop-In, Soft-Optimized System, and Soft-Optimized Compressor Test Reports)
(2) Domanski, P; Theoretical Evaluation of R-22 and R-502 Alternatives 1993
(3) Godwin, D; Proceedings of the 1993 International CFC and Halon Alternatives Conference 1993
(4) Godwin, D; Results of System Drop-In Tests in ARI's R-22 Alternative Refrigerants Evaluation Program 1993

L15 ANSWER 85 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1997:790304 CAPLUS
DN 128:116805
OREF 128:22863a,22866a
ED Entered STN: 19 Dec 1997
TI Vapor-liquid equilibrium data for binary mixtures of some new refrigerants
AU Barley, M. H.; Morrison, J. D.; O'Donnel, A.; Parker, I. B.; Petherbridge, S.; Wheelhouse, R. W.
CS ICI Group R and T Centre, Cheshire, WA7 4QD, UK
SO Fluid Phase Equilibria (1997), 140(1-2), 183-206
CODEN: FPEQDT; ISSN: 0378-3812
PB Elsevier Science B.V.
DT Journal
LA English
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 68
AB In order to model the properties of alternative refrigerant blends, accurate vapor-liquid equilibrium (VLE) data were required over the range of temperature and pressure of interest to the refrigeration engineer. VLE data for six binary mixts. were reported for new hydrofluorocarbon refrigerants over a wide range of temps. and pressures. The six mixts. are: (1) R32/R125, (2) R32/R143a, (3) R32/R134a, (4) R125/R143a, (5) R125/R134a, and (6) R143a/R134a. The results for R32/R125 and R32/R134a were obtained down to at least -30°. The raw data were correlated to two models using Maximum Likelihood techniques. One of the models was then used to predict azeotropic compns. for three of the mixts. (R32/R125, R32/R143a and R125/R143a) and the approx. composition of a ternary saddle point azeotrope.
ST vapor liq equil refrigerant mixt; azeotrope refrigerant mixt vapor liq equil
IT Azeotropes
(binary; measurement of vapor-liquid equilibrium and prediction of azeotropes

of non-CFC refrigerant mixts.)
IT Refrigerants
Vapor-liquid equilibrium
(measurement of vapor-liquid equilibrium and prediction of azeotropes of non-CFC refrigerant mixts.)
IT Azeotropes
(ternary; measurement of vapor-liquid equilibrium and prediction of azeotropes of non-CFC refrigerant mixts.)
IT 75-10-5, R32 (Refrigerant) 354-33-6, R 125
420-46-2, R 143a 811-97-2, R 134a
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(systems; measurement of vapor-liquid equilibrium and prediction of azeotropes of non-CFC refrigerant mixts.)
RE.CNT 38 THERE ARE 38 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

(1) Abbot, M; Fluid Phase Equil 1986, V29, P193
(2) Anon; Montreal Protocol on substances that deplete the ozone layer 1987
(3) Anon; Montreal Protocol-Reassessment of phase-out dates, United Nations Environmental Program (UNEP) Meeting 1990
(4) Arnaud, D; Proceedings of the 18th International Congress of Refrigeration 1991, P664 CAPLUS
(5) Baehr, H; J Chem Thermodynamics 1991, V23, P1063 CAPLUS
(6) Bard, Y; Nonlinear Parameter Estimation 1974, P61
(7) Baroncini, C; Proceedings of IIR/IIF Commissions B 1/2 Conference - Energy efficiency in refrigeration and global warming impact-Ghent 1993, P207 CAPLUS
(8) Boggs, P; User's reference guide for ODRPACK version 2.01, Software for weighted orthogonal distance regression-4834 1992
(9) Dahl, S; AIChE J 1990, V36, P1829 CAPLUS
(10) Davey, L; Paper to be presented at the 13th Symposium on Thermophysical Properties 1997
(11) Defibaugh, D; Fluid Phase Equil 1992, V80, P157 CAPLUS
(12) Defibaugh, D; J Chem Eng Data 1994, V39, P333 CAPLUS
(13) Fujiwara, K; Proceedings of the Thirteenth Japan Symposium on Thermo-physical Properties, Paper A116 1992, P61
(14) Fukushima, M; Trans JAR 1993, V10, P87 CAPLUS
(15) Higashi, Y; Proceedings of the 12th symposium on thermophysical properties, Int J Thermophys 1995, V16, P1175 CAPLUS
(16) Higashi, Y; Proceedings of the 19th International Congress on Refrigeration-IIR Commission B1 1995, VIVa, P297
(17) Huron, M; Fluid Phase Equil 1979, V3, P255 CAPLUS
(18) Kubota, H; J Chem Eng Jpn 1993, V26, P320 CAPLUS
(19) Maezawa, Y; J Chem Eng Data 1990, V35, P225 CAPLUS
(20) Malbrunot, P; J Chem Eng Data 1968, V13, P16 CAPLUS
(21) Mathias, P; Fluid Phase Equil 1983, V13, P91 CAPLUS
(22) McLinden, M; ASHRAE Trans 1989, V95, P263
(23) Morrison, G; Fluid Phase Equil 1991, V62, P65 CAPLUS
(24) Morrison, G; National Bureau of Standards Technical Note 1226 1986
(25) Morrison, J; Proceedings of the 12th symposium on thermophysical properties, Int J Thermophys 1995, V16, P1165 CAPLUS
(26) Parker, I; High Temperatures-High Pressures 1996, V27-28, P205
(27) Redlich, O; Chem Rev 1949, V44, P233 CAPLUS
(28) Reid, R; The Properties of Gases and Liquids, 4th edn 1987
(29) Singh, R; Proceedings of International CFC and Halon Alternative Conference 1991, P451
(30) Walas, S; Phase Equilibria in Chemical Engineering 1985
(31) Weber, L; Int J Thermophys 1989, V10, P617
(32) Weber, L; J Chem Eng Data 1993, V38, P254 CAPLUS
(33) Weber, L; J Chem Eng Data 1994, V39, P808 CAPLUS

(34) Widiamato, J; High Temperatures-High Pressures 1993, V25, P677
(35) Widiamato, J; J Chem Eng Data 1994, V39, P304
(36) Widiamato, J; Proceedings of the 12th symposium on thermophysical properties, Int J Thermophys 1995, V16, P1165
(37) Wilson, G; J Am Chem Soc 1964, V86, P127 CAPLUS
(38) Yokoyama, C; Fluid Phase Equilibria V40

L15 ANSWER 86 OF 175 CAPLUS
AN 1997:756808 CAPLUS
DN 127:359722
OREF 127:70407a,70410a
ED Entered STN: 04 Dec 1997
TI Polyurethane foam thermal insulators using hydrofluorocarbons as blowing agents
IN Murai, Michio; Mitani, Tetsuo
PA Mitsubishi Electric Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C08J009-14
ICS C08J009-02; C08L075-04
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 67
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 09302130	A	19971125	JP 1996-124592	19960520
PRAI	JP 1996-124592		19960520		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 09302130	ICM	C08J009-14
	ICS	C08J009-02; C08L075-04
	IPCI	C08J0009-14 [ICM,6]; C08J0009-02 [ICS,6]; C08L0075-04 [ICS,6]
	IPCR	C08J0009-02 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]

AB The title insulators, useful for refrigerators, freezers, etc., are prepared from isocyanates (e.g., MDI), polyols (e.g., ethylene oxide-propylene oxide-tolylenediamine copolymer), cyclopentane and hydrofluorocarbons with b.p. <20° (e.g., HFC 134a, HFC 152a, HFC 125, HFC 32, HFC 143a, HFC 245fa, HFC 236ea, HFC 143, HFC 245ca, HFC 356mff) as blowing agents, polymerization catalysts (e.g., Kaolizer 1), and foam stabilizers (e.g., L-5340).
ST hydrofluorocarbon blowing polyurethane thermal insulator; polymn catalyst polyurethane thermal insulator; foam stabilizer polyurethane thermal insulator
IT Hydrocarbons, uses
RL: MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(fluoro, blowing agents; polyurethane foam thermal insulators using hydrofluorocarbons as blowing agents)
IT Polysiloxanes, uses
Polysiloxanes, uses
RL: MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(polyoxyalkylene-, foam stabilizers; polyurethane foam thermal insulators using hydrofluorocarbons as blowing agents)
IT Polyoxyalkylenes, uses
Polyoxyalkylenes, uses

```
     RL: MOA (Modifier or additive use); TEM (Technical or engineered material
     use); USES (Uses)
        (polysiloxane-, foam stabilizers; polyurethane foam
        thermal insulators using hydrofluorocarbons as blowing agents)
IT   Polymerization catalysts
     Stabilizing agents
     Thermal insulators
        (polyurethane foam thermal insulators using
        hydrofluorocarbons as blowing agents)
IT   Polyurethanes, processes
     RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical
     process); PRP (Properties); PREP (Preparation); PROC (Process)
        (rigid foams; polyurethane foam thermal insulators
        using hydrofluorocarbons as blowing agents)
IT   75-10-5, HFC 32   75-37-6, HFC 152a   287-92-3, Cyclopentane
     354-33-6, HFC 125   407-59-0, HFC 356mff 420-46-2, HFC
     143a   430-66-0, HFC 143   431-63-0, HFC 236ea   460-73-1, HFC 245fa
     679-86-7, HFC 245ca 811-97-2, HFC 134a
     RL: MOA (Modifier or additive use); TEM (Technical or engineered material
     use); USES (Uses)
        (blowing agents; polyurethane foam thermal insulators using
        hydrofluorocarbons as blowing agents)
IT   111-18-2, Kaolizer 1
     RL: MOA (Modifier or additive use); TEM (Technical or engineered material
     use); USES (Uses)
        (polymerization catalysts; polyurethane foam thermal insulators
        using hydrofluorocarbons as blowing agents)
IT   85170-26-9P
     RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical
     process); PRP (Properties); PREP (Preparation); PROC (Process)
        (rigid foams; polyurethane foam thermal insulators
        using hydrofluorocarbons as blowing agents)

L15  ANSWER 87 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1997:724352  CAPLUS
DN   128:5124
OREF 128:1043a,1046a
ED   Entered STN:  17 Nov 1997
TI   The replacement of CFCs in refrigeration equipment by
     environmentally benign alternatives
AU   Hewitt, N. J.; McMullan, J. T.
CS   Energy Res. Cent., Univ. Ulster, Coleraine, BT521SA, UK
SO   Applied Thermal Engineering (1997), 17(8-10), 955-972
     CODEN: ATENFT; ISSN: 1359-4311
PB   Elsevier
DT   Journal
LA   English
CC   48-5 (Unit Operations and Processes)
     Section cross-reference(s): 59
AB   The replacement of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons
     (HCFCs) is of prime importance since these refrigerants make up the vast
     majority of the working fluids used by the refrigeration
     industry, and suitable alternatives must be found.  A number of suitable pure
     fluids were considered to establish their properties and, in the case of
     flammable fluids, a risk anal. was carried out in order to assess their
     safety.  The properties of their mixts. were calculated and suitable equations
     and p-h charts presented.  Compressor lubricants have had to be changed
     since the majority of the CFC and HCFC replacements are hydrofluorocarbons
     (HFCs).  Typically, HFCs are immiscible in the traditional mineral oils
     and thus a new generation of synthetic oils (usually polyol ester based)
     have been produced.  The properties of these oils have been investigated
     and various models, including a modified Flory-Huggins equation, have been
```

used to describe their solubility in refrigerants. The effects of refrigerant/oil solubility of the pure refrigerants and their mixts. on system performance have also been analyzed and, in the case of refrigerant mixts., there is a possibility of a composition change due to the differential solubility which influences performance. Finally, compact plate heat exchangers were found to be excellent heat exchangers for the refrigeration industry, provided that it is remembered that there are control and capacity variation limitations associated with their use. The falling film evaporator is studied in detail and there is a possibility that it will fulfill its potential. Compressors tested with alternative refrigerants have shown (in the case of R407c, as replacement for R22) a deterioration in performance with decreasing evaporator temperature when compared to that of R22, while some of the flammable refrigerants may require larger compressors than the CFC and HCFC counterparts, due to their smaller mass flow rates.

ST refrigerant alternative environmentally benign; safety alternative refrigerant environmentally benign

IT Refrigerants
(alternative; replacement of CFCs in refrigeration apparatus by environmentally benign alternatives)

IT Hydrocarbons, processes
RL: REM (Removal or disposal); PROC (Process)
(chlorofluorocarbons; replacement of CFCs in refrigeration apparatus by environmentally benign alternatives)

IT Evaporators
(falling-film; replacement of CFCs in refrigeration apparatus by environmentally benign alternatives)

IT Hydrocarbons, uses
RL: NUU (Other use, unclassified); USES (Uses)
(fluoro; replacement of CFCs in refrigeration apparatus by environmentally benign alternatives)

IT Plates
Plates
(heat exchanging; replacement of CFCs in refrigeration apparatus by environmentally benign alternatives)

IT Heat exchangers
Heat exchangers
(plate; replacement of CFCs in refrigeration apparatus by environmentally benign alternatives)

IT Cloud point
Flammability
Heat transfer
Liquid mixtures
Miscibility
Risk assessment
Safety
Solubility
Thermal conductivity
Vapor pressure
Vapor-liquid equilibrium
Viscosity
(replacement of CFCs in refrigeration apparatus by environmentally benign alternatives)

IT Hydrocarbons, uses
RL: NUU (Other use, unclassified); USES (Uses)
(replacement of CFCs in refrigeration apparatus by environmentally benign alternatives)

IT 74-98-6, R-290, properties 75-10-5, R-32 75-28-5, R-600a 75-37-6, R-152a 75-45-6, R-22 75-71-8, R-12 76-15-3, R-115 106-97-8, R-600, properties 354-33-6, R-125 420-46-2, R-143a 811-97-2, R-134a 2837-89-0, R-124 39432-81-0, R-502 133023-17-3, R-410a 158675-78-6, R-407c

RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)
(replacement of CFCs in refrigeration apparatus by environmentally benign alternatives)

RE.CNT 70 THERE ARE 70 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Asblad, A; Int J Heat Mass Transfer 1991, V34(3), P835
(2) Badr, O; Appl Energy 1990, V37, P247 CAPLUS
(3) Bae, Y; J Appl Polymer Sci 1993, V147, P1193
(4) Baroncini, C; Energy Efficiency in Refrigeration and Global Warming Impact 1992, P207
(5) Baroncini, C; High Temp High Press 1993, V25, P459 CAPLUS
(6) Basile, G; IIR Commissions B1, B2, E1, E2 International Conference P215
(7) Basile, G; IIR Commissions B1, B2, E1, E2 International Conference 1994, P821 CAPLUS
(8) Bonner, D; AICHE J 1973, V19, P961
(9) Boyes, S; Int J Thermophys 1994, V15(3), P443 CAPLUS
(10) Burke, M; IIR Commissions B1, B2, E1, E2 International Conference 1994, P89 CAPLUS
(11) Chapman, W; Ind Engng Chem Res 1990, V29, P1709 CAPLUS
(12) Chen, J; IIR Commissions B1, B2, E1, E2 International Conference 1994, P133
(13) Chun, K; ASME J Heat Transfer 1971, P391 CAPLUS
(14) Elbro, H; Macromolecules 1990, V23, P4707 CAPLUS
(15) Fang, Y; J Chem Engng Data 1995, V40, P148
(16) Flory, P; J Chem Phys 1942, V10, P51 CAPLUS
(17) Fredenslundet, A; Ind Engng Chem Res 1994, V33, P1331
(18) Fujita, T; Int J Heat Mass Transfer 1978, V21, P97 CAPLUS
(19) Giuliani, G; IIR Commissions B1, B2, E1, E2 International Conference 1994, P525 CAPLUS
(20) Gropp, U; Chem Engng Process 1986, V20, P103 CAPLUS
(21) Hankinson, R; AIChEJ 1979, V25, P653 CAPLUS
(22) Happel, O; Proc 5th Int Heat Transfer Conf 1974, V4, Pb7.8
(23) Hewitt, N; 19th International Congress of Refrigeration, Proceedings 1995, V4a, P283 CAPLUS
(24) Hewitt, N; Int J Energy Res 1993, V17, P393 CAPLUS
(25) Hewitt, N; Int J Energy Res 1996, V20, P143 CAPLUS
(26) Hewitt, N; JOULE II Programme, Sub-Programme Energy Conservation and Utilisation 1995, JOU2-CT92-0060
(27) Huang, S; Ind Engng Chem Res 1990, V29, P2248
(28) Huang, S; Ind Engng Chem Res 1991, V30, P1994 CAPLUS
(29) Huggins, M; J Chem Phys 1942, V9, P440
(30) Jung, D; Int J Heat Mass Transfer 1989, V32(1), P131 CAPLUS
(31) Jung, D; Int J Heat Mass Transfer 1989, V32(9), P1751 CAPLUS
(32) Kammeret, H; Polymer 1989, V30, P888
(33) Kubota, H; Int J Thermophys 1989, V10(3), P629
(34) Kuijpers, L; Int J Refrig 1993, V16(3), P210
(35) Lee, B; AIChE J 1975, V21, P510 CAPLUS
(36) Malbrunot, P; J Chem Engng Data 1968, V13, P16 CAPLUS
(37) Martin, J; AIChE J 1955, V12, P142
(38) Martin, J; AIChE J 1959, V5(2), P159
(39) Niederkruger, F; Int J Refrig 1992, V15, P1
(40) Niesen, N; Fluid Phase Equilibria 1994, V97, P81
(41) Oishi, T; Ind Engng Chem Process Des Dev 1978, V17, P333 CAPLUS
(42) Patterson, D; Macromolecules 1978, V11, P690 CAPLUS
(43) Ploecker, U; Ind Engng Chem Process Des 1978, V17(3) CAPLUS
(44) Quianet, C; Macromolecules 1991, V24, P1655
(45) Santacesaria, E; J Fluorine Chem 1993, V61, P123 CAPLUS
(46) Sato, T; J Chem Engng Data 1994, V39, P851 CAPLUS
(47) Schlunder, E; Proc 8th Int Heat Transfer Conf 1986, V5, P2073
(48) Schlunder, E; Verfahrenstechnik 1982, V16(9), P692
(49) Shankland, I; ASHRAE Trans 1990, V3418, P317
(50) Singh, R; Personal Communication 1992

(51) Siowet, K; Macromolecules 1972, V5, P29
(52) Soave, G; Chem Engng Sci 1980, V35, P1725 CAPLUS
(53) Steiner, D; Warmeubergang beim Sieden gesattigter Flussigkeiten 1984
(54) Stephan, K; Chem Ing Tech 1969, V41, P409 CAPLUS
(55) Stephen, K; Heat Transfer in Condensation and Boiling 1992
(56) Tapavicza, S; Int Chem Engng 1976, V16, P329
(57) Thomson, G; AIChEJ 1982, V28, P671 CAPLUS
(58) van Gerwen, R; IIR B2 Conference 1994
(59) Wagner, W; Cryogenics 1973, V21, P470
(60) Weber, L; Int J Thermophys 1989, V10(3), P617
(61) Weber, L; J Chem Engng Data 1993, V48, P254
(62) Weber, L; J Chem Engng Data 1993, V38(2), P333
(63) Weber, L; J Chemical Engng Data 1994, V39, P808 CAPLUS
(64) Widiatmo, J; 3rd Asian Thermophysical Properties Conf 1992, P364
(65) Widiatmo, J; J Chem Engng Data 1994, V38(2), P304
(66) Wilson, D; ASHRAE Trans 1988, V94(2), P2095
(67) Wilson, L; Fluid Phase Equil 1992, V80, P167 CAPLUS
(68) Wilson, L; Fluid Phase Equilibria 1990, V80, P167
(69) Yuksel, E; Chem Engng Process 1988, V22, P193
(70) Zhu, M; Int J Thermophysics 1993, V14(6), P1221 CAPLUS

L15 ANSWER 88 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1997:670907 CAPLUS
DN 127:308312
OREF 127:60299a,60302a
ED Entered STN: 22 Oct 1997
TI Elastomers as sealing material in refrigeration systems
AU Richter, Bernhard
CS O-Ring-Pruflabor Richter, Grossbottwar, Germany
SO Ki Luft- und Kaeltetechnik (1997), 33(10), 483-488
CODEN: KLKAE5; ISSN: 0945-0459
PB Verlag C. F. Mueller
DT Journal
LA German
CC 39-12 (Synthetic Elastomers and Natural Rubber)
AB The use of elastomers as sealing materials in refrigeration systems is discussed as well as the requirements on the elastomers itself. The compatibility of various elastomers with other polymers, refrigerants, and refrigerator oils is discussed. Recipes of various elastomers used as sealings e.g. chloroprene rubber, nitrilobutadiene rubber, ethylene propylene rubber, and fluororubber are given as well as their properties e.g. temperature behavior, hardness, and permanent set.
ST elastomer sealing refrigeration system compatibility; rubber chloroprene nitrile fluoro sealing refrigeration
IT Benzenoids
RL: MSC (Miscellaneous)
(alkyl; chemical resistance of rubbers sealing)
IT Nitrile rubber, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(hydrogenated; properties of rubbers as sealing material in refrigeration systems)
IT Chemically resistant materials
Gaskets
Oil-resistant materials
Seals (parts)
(properties of rubbers as sealing material in refrigeration systems)
IT EPDM rubber
Fluoro rubber
Neoprene rubber, properties
Nitrile rubber, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)

```
        (properties of rubbers as sealing material in refrigeration
        systems)
IT   Hydrocarbon oils
     Paraffin oils
     RL: MSC (Miscellaneous)
        (properties of rubbers as sealing material in refrigeration
        systems)
IT   9010-98-4
     RL: DEV (Device component use); PRP (Properties); USES (Uses)
        (neoprene rubber, properties of rubbers as sealing material in
        refrigeration systems)
IT   9003-18-3
     RL: DEV (Device component use); PRP (Properties); USES (Uses)
        (nitrile rubber, hydrogenated; properties of rubbers as sealing
        material in refrigeration systems)
IT   9003-18-3
     RL: DEV (Device component use); PRP (Properties); USES (Uses)
        (nitrile rubber, properties of rubbers as sealing material in
        refrigeration systems)
IT   125624-30-8, Zerol 150
     RL: MSC (Miscellaneous)
        (properties of rubbers as sealing material in refrigeration
        systems)
IT   74-98-6, R 290, miscellaneous 75-10-5, R 32   75-28-5, R 600a
     75-37-6, R 152a   75-45-6, R 22   75-68-3, R 142b   306-83-2, R 123
     354-33-6, R 125   359-35-3, R 134 420-46-2, R 143a
     811-97-2, R 134a   2837-89-0, R 124   7664-41-7, R 717,
     miscellaneous
     RL: MSC (Miscellaneous)
        (refrigerant; chemical resistance of rubbers sealing)

L15  ANSWER 89 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1997:542209  CAPLUS
DN   127:207591
OREF 127:40309a,40312a
ED   Entered STN:  25 Aug 1997
TI   Refrigerator using specified refrigerant compositions
IN   Umezawa, Hiroyuki
PA   Sanyo Electric Co., Ltd., Japan
SO   Jpn. Kokai Tokkyo Koho, 6 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C09K005-04
     ICS  B41M005-26; F25B001-00; G11B007-24
CC   48-5 (Unit Operations and Processes)
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.       DATE
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PI   JP 09208940          A     19970812   JP 1996-35804         19960131
PRAI JP 1996-35804              19960131
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 JP 09208940     ICM    C09K005-04
                 ICS    B41M005-26; F25B001-00; G11B007-24
                 IPCI   C09K0005-04 [ICM,6]; B41M0005-26 [ICS,6]; F25B0001-00
                        [ICS,6]; G11B0007-24 [ICS,6]
                 IPCR   B41M0005-26 [I,C*]; B41M0005-26 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; F25B0001-00 [I,C*];
                        F25B0001-00 [I,A]; G11B0007-24 [I,C*]; G11B0007-24
                        [I,A]
```

AB   In the title apparatus using refrigerant compns. containing (1)
pentafluoroethane
     (R125), 1,1,1-trifluoroethane (R143a) and 1,1,1,2-tetrafluoroethane
     (R134a), or (2) difluoromethane (R32), pentafluoroethane (R125) and
     1,1,1,2-tetrafluoroethane (R134a), 3-6 weight% of ≥1 hydrocarbons
     selected from n-pentane, isopentane and cyclopentane are sealed in the
     refrigerant circuit. The hydrocarbons have good miscibility with
     refrigerator oils, e.g., mineral oils, alkylbenzenes, ester-type
     and ether-type lubricating oils, or their mixts. The refrigerant compns.
     are suitable for ozone layer depletion prevention.
ST   refrigerator refrigerant compn hydrocarbon
IT   Benzenoids
     RL: TEM (Technical or engineered material use); USES (Uses)
        (alkyl, refrigerator oils containing; refrigerator
        using specified refrigerant compns.)
IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (miscible with refrigerator oils; refrigerator
        using specified refrigerant compns.)
IT   Lubricating oils
        (refrigerator oils containing; refrigerator using
        specified refrigerant compns.)
IT   Hydrocarbon oils
     RL: TEM (Technical or engineered material use); USES (Uses)
        (refrigerator oils containing; refrigerator using
        specified refrigerant compns.)
IT   Refrigerants
       Refrigerating apparatus
        (refrigerator using specified refrigerant compns.)
IT   78-78-4, Isopentane   109-66-0, n-Pentane, uses   287-92-3, Cyclopentane
     RL: TEM (Technical or engineered material use); USES (Uses)
        (miscible with refrigerator oils; refrigerator
        using specified refrigerant compns.)
IT   150743-07-0, R404A   158675-78-6, R407A
     RL: TEM (Technical or engineered material use); USES (Uses)
        (refrigerant composition; refrigerator using specified refrigerant
        compns.)
IT   75-10-5, Difluoromethane 354-33-6, Pentafluoroethane
     420-46-2, 1,1,1-Trifluoroethane 811-97-2,
     1,1,1,2-Tetrafluoroethane
     RL: TEM (Technical or engineered material use); USES (Uses)
        (refrigerant compns. containing; refrigerator using specified
        refrigerant compns.)

L15 ANSWER 90 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1997:533062 CAPLUS
DN   127:192385
OREF 127:37289a,37292a
ED   Entered STN: 21 Aug 1997
TI   New working fluids to replace CFCs and HCFCs in refrigeration
     and air conditioning applications
AU   Reiss, Dipl.-Ing. M.
CS   Hoechst AG, R & D Chemicals, Frankfurt/Main, Germany
SO   Proceedings - International Congress of Refrigeration, 19th, The Hague,
     Aug. 20-25, 1995 (1995), Volume 4A, 503-510 Publisher: Institut
     International du Froid, Paris, Fr.
     CODEN: 64VHAQ
DT   Conference
LA   English
CC   48-5 (Unit Operations and Processes)
AB   The table shows all the maximum percentage deviations occurring for the
     individual refrigeration variables in each of the three cases of

leakage examined This once again makes clear that the smaller the temperature glide, the smaller the percentage deviations, with the exception of the compression ratio for HX4.
ST replacement refrigerant variable deviation; air conditioning refrigerant variable deviation; working fluid replacement property; leakage refrigerant variable deviation
IT Refrigerants
(maximum percentage deviations of refrigeration variables during leakage)
IT Air conditioning
(maximum percentage deviations of working fluid variables for air conditioning during leakage)
IT 75-10-5, R32 354-33-6, R125 420-46-2, R143a
811-97-2, R134a 150743-07-0, R404A 158675-78-6, R407C
173268-57-0, HX4
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(maximum percentage deviations of refrigeration variables during leakage)

L15 ANSWER 91 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1997:529209 CAPLUS
DN 127:163437
OREF 127:31659a,31662a
ED Entered STN: 20 Aug 1997
TI Experimental results and theoretical investigations with alternative refrigerants
AU Engler, T.; Mossner, F.; Oellrich, L. R.
CS Institut Technische Thermodynamik Kaltetechnik, Univ. Karlsruhe, Karlsruhe, Germany
SO Proceedings - International Congress of Refrigeration, 19th, The Hague, Aug. 20-25, 1995 (1995), Volume 4B, 774-781 Publisher: Institut International du Froid, Paris, Fr.
CODEN: 64VHAQ
DT Conference
LA English
CC 45-5 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
AB In recent years numerous proposals for new and alternative refrigerants have been issued. By application and further development of a computer simulation package (BPBP), a systematic screening of binary and ternary mixts. for typical com. refrigeration applications was performed together with application of the TEWI (Total Equivalent Warming Impact) concept. Exptl. investigations with pure substances and mixts. were carried out on a vapor compression test stand equipped with a semihermetic compressor in the power range of com. refrigeration.
Condensation temps. were altered from 30° C to 40° C, evaporation temps. from -10° C to -45° C. The binary and ternary mixts. investigated were composed of the chlorine free refrigerants R134a, R32, R125, R143a, R290 and R600. The results are compared to data for R22 and R502 obtained in the same test stand. The results of the ecol. screening and the mutual refrigerant efficiency are presented.
ST chlorine free refrigerant mixt evaluation
IT Refrigerants
(exptl. and theor. evaluation of chlorine-free refrigerants and their mixts.)
IT 74-98-6, R290, uses 75-10-5, R32 75-45-6, R22 106-97-8,
R600, uses 354-33-6, R125 420-46-2, R143a
811-97-2, R134a 39432-81-0, R502
RL: TEM (Technical or engineered material use); USES (Uses)
(exptl. and theor. evaluation of alternative refrigerants and their mixts.)

L15 ANSWER 92 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1997:297482 CAPLUS
DN 127:20217
OREF 127:3997a,4000a
ED Entered STN: 10 May 1997
TI A study on the thermodynamic performance of R-502 alternatives
AU Park, Y. B.; Jung, D. S.
CS Department of Mechanical Engineering, Inha University, S. Korea
SO Nonmunjip - Sanop Kwahak Kisul Yonguso (Inha Taehakkyo) (1995), 23, 53-62
CODEN: NSKYDM; ISSN: 0253-6234
PB Inha University
DT Journal
LA Korean
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 59
AB R-502 is extensively used as the working fluid of low-temperature refrigerating systems. But, the environmental problems of ozone depleting chlorofluorocarbons have been identified and the use of CFCs is restricted worldwide under the Montreal protocol. Thus, replacement fluids are going to be needed to replace R-502, which is a mixture of HCFC 22 and CFC 115. To effectively replace R-502, a thermodn. anal. is carried out for the alternatives (AZ50, HP62, HP80, HP81, FX10, KLEA 60, KLEA 61) and R-502 by using computer simulation, and an exptl. test stand was manufactured to exptl. determine the thermodn. performance for comparison with theor. results. Theor. results indicated that the alternatives may replace R-502 without a significant system change, except for a suction line heat exchanger. When the system contains a suction line heat exchanger, however, COPs of alternatives increase up to approx. 15-20% compared to those of the system without the suction line heat exchanger. But simultaneously the discharge temperature of the compressor also increases. Thus, further research on oil return should be undertaken to analyze the practical characteristics of the alternatives in the real refrigerating unit.
ST R502 alternative refrigerant performance; HCFC22 CFC115 R502 alternative refrigerant
IT Heat transfer
Refrigerants
(thermodn. performance of R 502 alternative refrigerants)
IT 150621-87-7
RL: PRP (Properties)
(AZ 50; thermodn. performance of R 502 alternative refrigerants)
IT 76-15-3, CFC-115
RL: PRP (Properties)
(CFC 115; thermodn. performance of R 502 alternative refrigerants)
IT 150743-07-0, FX 10
RL: PRP (Properties)
(FX 10, HP 62; thermodn. performance of R 502 alternative refrigerants)
IT 75-45-6, Hcfc 22
RL: PRP (Properties)
(HCFC 22; thermodn. performance of R 502 alternative refrigerants)
IT 149437-06-9, HP 80
RL: PRP (Properties)
(HP 80, HP 81; thermodn. performance of R 502 alternative refrigerants)
IT 39432-81-0, r-502
RL: PRP (Properties)
(R 502; thermodn. performance of)
IT 74-98-6, r-290, properties 75-10-5, r-32 354-33-6,
r-125 420-46-2, r-143a 811-97-2, r-134a 158675-78-6,
KLEA 60
RL: PRP (Properties)
(thermodn. performance of R 502 alternative refrigerants)

L15 ANSWER 93 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1997:236645 CAPLUS
DN 126:318747
OREF 126:61819a,61822a
ED Entered STN: 11 Apr 1997
TI Experimental evaluation of refrigerant mixtures as substitutes for CFC12
and R502
AU Camporese, R.; Bigolaro, G.; Bobbo, S.; Cortella, G.
CS Consiglio Nazionale delle Ricerche Corso Stati Uniti, Istituto per la
Tecnica del Freddo, Padua, 4 - I 35100, Italy
SO International Journal of Refrigeration (1997), 20(1), 22-31
CODEN: IJRFDI; ISSN: 0140-7007
PB Elsevier
DT Journal
LA English
CC 47-4 (Apparatus and Plant Equipment)
AB Several selected refrigerant mixts. are tested as potential short- and
mid-term substitutes for CFC12 and R502. HCFC22 and some hydrocarbons are
considered as components of retrofit mixts. Their influence on the solubility
of various lubricant oils is investigated by measuring critical solubility
temps.
The performance of the CFC12 and R502 refrigerants and of their proposed
alternatives is compared by testing two different refrigerating
units.
ST refrigerant chlorofluorocarbon substitute
IT Refrigerants
(refrigerant mixts. as substitutes for CFC12 and R502)
IT 74-98-6, Propane, uses 75-10-5, Hfc32 75-28-5, R 600a
75-45-6, R 22 106-97-8, R 600, uses 354-33-6, Hfc 125
420-46-2, Hfc143a 811-97-2, Hfc 134a 2837-89-0
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(refrigerant mixts. as substitutes for CFC12 and R502)

L15 ANSWER 94 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1997:58964 CAPLUS
DN 126:145743
OREF 126:28151a,28154a
ED Entered STN: 27 Jan 1997
TI Property estimation for "new" refrigerants
AU Lovatt, S. J.; Chadderton, T.
CS Meat Industry Research Institute New Zealand, Hamilton, N. Z.
SO Science et Technique du Froid (1996), (1, Refrigeration, Climate Control
and Energy Conservation), 254-261
CODEN: STFRD4; ISSN: 0151-1637
PB Institut International du Froid
DT Journal
LA English
CC 48-5 (Unit Operations and Processes)
AB This paper presents computational times for a range of refrigerant
property calcns. using various equations of state and property
correlations. For each set of calcns., accuracies are compared to a
nominated "most accurate" equation of state. Ozone-safe refrigerants are
emphasized in the data tables. The results will help
refrigeration designers and those simulating refrigeration
processes to trade off convenience, accuracy and computation time when
choosing property prediction methods to suit their applications.
ST thermodn property alternative refrigerant; equation state alternative
refrigerant
IT Computer application
(computation time; property estimation and equations of state for ozone-safe
refrigerants)

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IT   Climate
        (greenhouse effect; property estimation and equations of state for
        ozone-safe refrigerants)
IT   Compression
        (isentropic; property estimation and equations of state for ozone-safe
        refrigerants)
IT   Refrigerants
        (ozone-safe; property estimation and equations of state for ozone-safe
        refrigerants)
IT   Enthalpy
     Entropy
     Equation of state
     Thermodynamics
     Vapor pressure
        (property estimation and equations of state for ozone-safe refrigerants)
IT   75-10-5   75-28-5   75-37-6, r-152a   75-45-6   75-46-7
     124-38-9, Carbon dioxide, properties   306-83-2, r-123 354-33-6,
     r-125 420-46-2, r-143a 811-97-2, r-134a
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (property estimation and equations of state for ozone-safe refrigerants)
RE.CNT  10    THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
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```
(1) Barret, M; Proc 1992 Int Refrig Conf 1992, VII, P433
(2) Fukushima, M; Proc 19th Int Cong Refrig 1995, VIVa, P207
(3) Iir; Thermodynamic and physical properties - R134a, Tables and diagrams for
    the refrigeration industry 1992
(4) Iir; Thermodynamic and physical properties - R22, Tables and diagrams for
    the refrigeration industry, 2nd Edition 1992
(5) McLinden, M; Int J Refrig 1990, V13, P149 CAPLUS
(6) Mecarik, K; Heat Recov Syst CHP 1991, V11, P193 CAPLUS
(7) Morrison, G; Int J Refrig 1993, V16, P129 CAPLUS
(8) Perry, R; Perry's Chemical Engineers' Handbook, 6th Edition 1984
(9) Press, W; Numerical Recipes:The Art of Scientific Computing 1986
(10) Reid, R; The Properties of Gases and Liquids, 4th Edition 1987
```


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L15  ANSWER 95 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1996:718992  CAPLUS
DN   126:76954
OREF 126:14857a,14860a
ED   Entered STN:  07 Dec 1996
TI   Acetal-containing working-fluid composition for refrigerating
     machine
IN   Sawada, Hiroki; Togashi, Hiroyasu
PA   Kao Corporation, Japan
SO   U.S., 10 pp.
     CODEN: USXXAM
DT   Patent
LA   English
IC   ICM  C09K005-04
     ICS  C10M105-18
INCL 252068000
CC   48-5 (Unit Operations and Processes)
     Section cross-reference(s): 28
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.       DATE
     ---------------     ----   --------   -------------------   --------
PI   US 5575944           A     19961119   US 1995-395827        19950228
PRAI US 1995-395827             19950228
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 US 5575944      ICM    C09K005-04
                 ICS    C10M105-18
                 INCL   252068000
                 IPCI   C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*];
                        C10M0105-18 [ICS,6]; C10M0105-00 [ICS,6,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00
                        [I,C*]; C10M0105-18 [I,A]; C10M0105-20 [I,A];
                        C10M0105-38 [I,A]; C10M0105-40 [I,A]; C10M0105-48
                        [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A];
                        C10N0030-00 [N,A]; C10N0040-30 [N,A]
                 NCL    252/068.000; 252/067.000; 508/304.000; 508/459.000;
                        508/579.000
                 ECLA   C09K005/04B4B; C10M105/18; C10M105/20; C10M105/40;
                        C10M105/48; C10M171/00R; M10M; M10M; M10M; M10M; M10M;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10N; M10N;
                        M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N
OS   MARPAT 126:76954
AB   The composition includes a refrigeration oil and a hydrofluorocarbon,
     the refrigeration oil including a compound having ≥1 acetal
     group in a mol. and also having trihydric to octahydric alc. residues as a
     base oil.
ST   acetal contg working fluid refrigerating app; hydrofluorocarbon
     oil working fluid refrigerating app; alc polyhydric acetal contg
     working fluid
IT   Refrigerating apparatus
        (acetal-containing working-fluid composition for)
IT   75-10-5   75-37-6, 1,1-Difluoroethane 354-33-6,
     Pentafluoroethane   359-35-3, 1,1,2,2-Tetrafluoroethane 420-46-2
     , 1,1,1-Trifluoroethane 811-97-2, 1,1,1,2-Tetrafluoroethane
     RL: TEM (Technical or engineered material use); USES (Uses)
        (in acetal-containing working-fluid composition for refrigerating
        machine)
IT   100-79-8DP, carbonic acid diester   100-79-8DP, carbonic acid diester,
     reaction product with 3-methyl-1,5-pentanediol   4457-71-0DP,
     3-Methyl-1,5-pentanediol, reaction product with carbonic acid diester of
     4-hydroxymethyl-2,2-dimethyl-1,3-dioxolane   13330-77-3P   185317-91-3P
     185317-93-5P   185317-95-7P   185353-94-0P
     RL: SPN (Synthetic preparation); TEM (Technical or engineered material
     use); PREP (Preparation); USES (Uses)
        (working-fluid composition for refrigerating machine from
        hydrofluorocarbons and)
IT   3842-72-6   86325-03-3   185317-98-0   185318-01-8   185318-03-0
     185318-06-3   185318-09-6   185318-11-0   185318-13-2   185318-15-4
     185318-17-6
     RL: TEM (Technical or engineered material use); USES (Uses)
        (working-fluid composition for refrigerating machine from
        hydrofluorocarbons and)

L15  ANSWER 96 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1996:707852  CAPLUS
DN   126:48744
OREF 126:9589a,9592a
ED   Entered STN:  28 Nov 1996
TI   Concentration shift when applying refrigerant mixtures
AU   Kruse, Horst; Chen, Jiufa
CS   Institut Kaeltetechnik Angewandte Waermetechnik, Universitaet Hannover,
     Hannover, Germany
SO   Ki Luft- und Kaeltetechnik (1996), 32(11), 501-504
     CODEN: KLKAE5; ISSN: 0945-0459
PB   Verlag C. F. Mueller
DT   Journal
LA   German
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CC   48-5 (Unit Operations and Processes)
AB   Concentration shifts of azeotropic refrigerant mixts. in refrigerating
     plants were detected. A model to calculate the shifts in a plant was
     established. The calculated and exptl. results were in good agreement.
ST   refrigerant mixt concn shift simulation
IT   Azeotropes
     Refrigerants
        (simulation of concentration shift of refrigerant mixts.)
IT   75-10-5   75-37-6, R152a   75-46-7 354-33-6, R125
     420-46-2, R143a 811-97-2, R134a   150743-07-0, R404a
     158675-78-6, R407c
     RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)
        (simulation of concentration shift of refrigerant mixts.)

L15 ANSWER 97 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1996:632780 CAPLUS
DN   125:285451
OREF 125:53207a,53210a
ED   Entered STN: 26 Oct 1996
TI   A nonlinear regression analysis for estimating low-temperature vapor
     pressures and enthalpies of vaporization applied to refrigerants
AU   Tillner-Roth, R.
CS   Thermophys. Div., Natl. Inst. Standards Technol., Boulder, CO, 80303, USA
SO   International Journal of Thermophysics (1996), 17(6), 1365-1385
     CODEN: IJTHDY; ISSN: 0195-928X
PB   Plenum
DT   Journal
LA   English
CC   65-6 (General Physical Chemistry)
     Section cross-reference(s): 48, 69
AB   A new method is presented to extrapolate exptl. vapor pressures down to
     the triple point. The method involves a nonlinear regression anal. based
     on the Clausius-Clapeyron equation and a simple relation for the enthalpy
     of vaporization. Triple-point pressures and vapor pressures up to 0.1-0.2
     MPa are estimated for R125, R32, R143a, R134a, R152a, R123, R124, and ammonia;
     they generally agree with available exptl. data within their uncertainty.
     Equations for the enthalpy of vaporization which describe this property
     fairly well at low temps. are obtained as a byproduct.
ST   vaporization enthalpy vapor pressure refrigerant; triple point pressure
     vaporization enthalpy refrigerant; nonlinear regression analysis
     refrigerant thermodn
IT   Heat of evaporation and Heat of condensation
     Vapor pressure
        (nonlinear regression anal. for estimating low-temperature vapor pressures
and
        enthalpies of vaporization applied to refrigerants)
IT   Triple point
        (triple-point pressure; nonlinear regression anal. for estimating
low-temperature
        vapor pressures and enthalpies of vaporization applied to refrigerants)
IT   Refrigeration
        (agents, nonlinear regression anal. for estimating low-temperature vapor
pressures
        and enthalpies of vaporization applied to refrigerants)
IT   75-10-5, R32   75-37-6, R152a   306-83-2, R123 354-33-6,
     R125 420-46-2, R143a 811-97-2, R134a   2837-89-0, R124
     7664-41-7, Ammonia, properties
     RL: PRP (Properties)
        (nonlinear regression anal. for estimating low-temperature vapor pressures
and
        enthalpies of vaporization applied to refrigerants)

L15 ANSWER 98 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1996:617649 CAPLUS
DN   125:251368
OREF 125:46922h,46923a
ED   Entered STN: 17 Oct 1996
TI   Refrigeration circuit employed new refrigerant
AU   Ohnishi, Haruo
CS   Mechanical Engineering Lab., Daikin Industries Ltd., Sakai, 591, Japan
SO   Nippon Reito Kyokai Ronbunshu (1996), 13(2), 121-131
     CODEN: NRKRET; ISSN: 0910-0040
PB   Nippon Reito Kyokai
DT   Journal; General Review
LA   Japanese
CC   48-0 (Unit Operations and Processes)
AB   A review, with 32 refs., of current status of evaluation of candidate alternative refrigerants, with suggestions on how to choose suitable alternative refrigerants for air conditioners, including environmental acceptability and safety. Topics discussed include development of alternative refrigerants, amendments to the Fourth Montreal Protocol, phase-out of HCFC production, safety, thermal properties, stability, price, energy efficiency, and compatibility with lubricants and materials.
ST   review evaluation alternative refrigerant; hydrochlorofluorocarbon refrigerant evaluation review; environmental pollution alternative refrigerant review; global warming alternative refrigerant review; ozone depletion alternative refrigerant review; safety alternative refrigerant evaluation review
IT   Air conditioning
     Safety
        (current status of evaluation of candidate alternative refrigerants in Japan)
IT   Lubricating oils
        (refrigerator, refrigerant compatibility with; current status of evaluation of candidate alternative refrigerants in Japan)
IT   Refrigeration
        (agents, non-chlorofluorocarbon; current status of evaluation of candidate alternative refrigerants in Japan)
IT   Hydrocarbons, properties
     RL: NUU (Other use, unclassified); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
        (chloro fluoro, current status of evaluation of candidate alternative refrigerants in Japan)
IT   Climate
        (greenhouse effect, potential; in current status of evaluation of candidate alternative refrigerants in Japan)
IT   Atmosphere
        (stratosphere, ozone depletion in; in current status of evaluation of candidate alternative refrigerants in Japan)
IT   74-98-6, R-290, properties 75-10-5, HFC-32   75-37-6, HFC152a
     75-45-6, HCFC-22 354-33-6, HFC125 420-46-2, HFC143a
     811-97-2, HFC134a   7664-41-7, R717, properties   39432-81-0, R502
     133023-17-3, R410a   158675-78-6, R407c
     RL: NUU (Other use, unclassified); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
        (alternative refrigerant; current status of evaluation of candidate alternative refrigerants in Japan)
IT   10028-15-6, Ozone, processes
     RL: GOC (Geological or astronomical occurrence); RCT (Reactant); REM (Removal or disposal); OCCU (Occurrence); PROC (Process); RACT (Reactant or reagent)
        (atmospheric depletion of; in current status of evaluation of candidate alternative refrigerants in Japan)

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L15  ANSWER 99 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1996:529585  CAPLUS
DN   125:172309
OREF 125:32199a,32202a
ED   Entered STN:  05 Sep 1996
TI   Formation of nonazeotropic coolant mixtures
IN   Fukushima, Masato; Ootoshi, Yukio
PA   Asahi Glass Co Ltd, Japan
SO   Jpn. Kokai Tokkyo Koho, 3 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C09K005-04
     ICS  F25B001-00
CC   48-5 (Unit Operations and Processes)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   JP 08157809          A     19960618    JP 1994-307718         19941212
     JP 3575089           B2    20041006
PRAI JP 1994-307718             19941212
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 JP 08157809     ICM    C09K005-04
                 ICS    F25B001-00
                 IPCI   C09K0005-04 [ICM,6]; F25B0001-00 [ICS,6]
                 IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; F25B0045-00 [I,C*];
                        F25B0045-00 [I,A]
AB   Combustable coolants(e.g., difluoromethane) and noncombustible
     coolants(forming azeotropic mixts. with the combustable coolants; e.g.,
     pentafluoroethane) are mixed and filled into coolant vessels, the vessels
     are then filled with other noncombustible coolants(e.g.,
     1,1,1,2-tetrafluoroethane) to form nonazeotropic coolant mixts.  Composition
     change of coolant mixts. is prevented.
ST   coolant mixt nonazeotropic formation
IT   Refrigeration
        (agents, formation of nonazeotropic coolant mixts.)
IT   75-10-5, Difluoromethane 354-33-6, Pentafluoroethane
     420-46-2, 1,1,1-Trifluoroethane 811-97-2,
     1,1,1,2-Tetrafluoroethane
     RL: PEP (Physical, engineering or chemical process); PROC (Process)
        (formation of nonazeotropic coolant mixts. of)

L15  ANSWER 100 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1996:396104  CAPLUS
DN   125:37258
OREF 125:7193a,7196a
ED   Entered STN:  10 Jul 1996
TI   Hydrofluorocarbon-based hydraulic fluid compositions
IN   Fukushima, Masato; Ootoshi, Yukio
PA   Asahi Glass Co Ltd, Japan
SO   Jpn. Kokai Tokkyo Koho, 4 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C09K005-04
CC   48-5 (Unit Operations and Processes)
     Section cross-reference(s): 51
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
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     ---------------     ----   --------    --------------------   --------
PI   JP 08100170          A     19960416    JP 1994-237823         19940930
PRAI JP 1994-237823             19940930
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
 --------------  -----  -----------------------------------------------
 JP 08100170     ICM    C09K005-04
                 IPCI   C09K0005-04 [ICM,6]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
AB   The compns. contain difluoromethane (3-40), trifluoroethane (5-60),
     tetrafluoroethane (5-60), and pentafluoroethane (10-87 weight%).  The compns.
     are useful for refrigerants, and chlorofluorocarbon substitutes.
ST   fluoromethane fluoroethane refrigerant chlorofluorocarbon substitute;
     hydraulic fluid refrigerant hydrofluorocarbon
IT   Hydraulic fluids
        (hydrofluorocarbon-based refrigerants containing fluoromethane and
        fluoroethanes as chlorofluorocarbon substitute)
IT   Refrigeration
        (agents, hydrofluorocarbon-based refrigerants containing fluoromethane and
        fluoroethanes as chlorofluorocarbon substitute)
IT   Hydrocarbons, miscellaneous
     RL: MSC (Miscellaneous)
        (chloro fluoro, hydrofluorocarbon-based refrigerants containing
        fluoromethane and fluoroethanes as chlorofluorocarbon substitute)
IT   75-10-5, HFC 32 354-33-6, HFC 125 420-46-2,
     HFC 143a 811-97-2, HFC 134a   27987-06-0, Trifluoroethane
     29759-38-4, Tetrafluoroethane
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (hydrofluorocarbon-based refrigerants containing fluoromethane and
        fluoroethanes as chlorofluorocarbon substitute)

L15  ANSWER 101 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1996:377495  CAPLUS
DN   125:62908
OREF 125:11979a,11982a
ED   Entered STN:  29 Jun 1996
TI   Method for lubricating compression-type refrigerating cycle
IN   Kaneko, Masato
PA   Idemitsu Kosan Co., Ltd., Japan
SO   U.S., 7 pp., Cont.-in-part of U.S. Ser. No. 897,846, abandoned.
     CODEN: USXXAM
DT   Patent
LA   English
IC   ICM  C09K005-04
INCL 252068000
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 2
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   US 5520833           A     19960528    US 1994-179684         19940111
PRAI US 1994-179684       A     19940111
     JP 1991-158244       B2    19910628
     US 1992-897846             19920612
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
 --------------  -----  -----------------------------------------------
 US 5520833      ICM    C09K005-04
                 INCL   252068000
                 IPCI   C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00
                        [I,C*]; C10M0105-06 [I,A]; C10M0171-00 [I,A];
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C10M0171-00 [I,C*]
NCL 252/068.000; 062/084.000; 062/468.000; 252/067.000
ECLA C09K005/04B4B; C10M105/06; C10M171/00R

AB A method for lubricating a compression-type refrigerating cycle using a substitute Flon refrigerant, i.e., a method for lubricating a compression-type refrigerating cycle which has either or both of an oil separator and a hot gas line, by the use of a substitute Flon refrigerant such as 1,1,1,2-tetrafluoroethane and a lubricant having a kinematic viscosity of 2 to 50 cst at 100° and an interfacial tension of 25 dyne/cm or above and being a liquid at ordinary temps.

ST lubricant compression type refrigerator

IT Esters, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(hindered; method for lubricating compression-type refrigerating cycle)

IT Lubricating oils
(method for lubricating compression-type refrigerating cycle)

IT Naphthenic oils
Paraffin oils
Polyesters, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(method for lubricating compression-type refrigerating cycle)

IT Refrigeration
(agents, method for lubricating compression-type refrigerating cycle)

IT Alkenes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(α-, polymers, method for lubricating compression-type refrigerating cycle)

IT 71-43-2D, Benzene, alkyl derivs. 75-10-5, Difluoromethane
75-37-6, 1,1-Difluoroethane 75-46-7 91-20-3D, Naphthalene, alkyl derivs. 354-33-6, Pentafluoroethane 359-35-3, 1,1,2,2-Tetrafluoroethane 420-46-2, 1,1,1-Trifluoroethane 811-97-2, 1,1,1,2-Tetrafluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(method for lubricating compression-type refrigerating cycle)

L15 ANSWER 102 OF 175 CAPLUS

AN 1996:363902 CAPLUS
DN 125:36782
OREF 125:7113a,7116a
ED Entered STN: 22 Jun 1996

TI Heat transfer and pressure drop characteristics of HFC quaternary refrigerant mixtures inside horizontal enhanced surface tubing

AU Sami, S. M.; Song, B.
CS School Engineering, University Moncton, Moncton, NB, E1A 3E9, Can.

SO Applied Thermal Engineering (1996), 16(6), 461-473
CODEN: ATENFT; ISSN: 1359-4311
PB Elsevier
DT Journal
LA English
CC 48-5 (Unit Operations and Processes)

AB Heat transfer characteristics of 2-phase flow condensation and boiling of quaternary (4 components) refrigerant mixts., on air/refrigerant horizontal enhanced surface tubing are presented, discussed and compared to other refrigerants proposed as substitutes for CFC-502, such as R-507 and R-407B. Heat transfer characteristics, such as average heat transfer coeffs., as well as pressure drops of ternary azeotropic refrigerant mixts., flow condensation and boiling inside enhanced surface tubing, were predicted. Exptl. data showed that this quaternary blend has a superior boiling heat transfer coefficient and higher pressure drop compared to CFC-502.

ST heat transfer hydrofluorocarbon quaternary refrigerant mixt; pressure drop

```
     hydrofluorocarbon quaternary refrigerant mixt
IT   Heat transfer
        (heat transfer and pressure drop characteristics of hydrofluorocarbon
        quaternary refrigerant mixts. inside horizontal enhanced surface
        tubing)
IT   Refrigeration
        (agents, heat transfer and pressure drop characteristics of
        hydrofluorocarbon quaternary refrigerant mixts. inside horizontal
        enhanced surface tubing)
IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro, heat transfer and pressure drop characteristics of
        hydrofluorocarbon quaternary refrigerant mixts. inside horizontal
        enhanced surface tubing)
IT   75-10-5, r32 354-33-6, r125 420-46-2, r143a
     811-97-2, r134a   39432-81-0, CFC-502   150621-87-7, R 507
     158675-78-6, R-407B
     RL: TEM (Technical or engineered material use); USES (Uses)
        (heat transfer and pressure drop characteristics of hydrofluorocarbon
        quaternary refrigerant mixts. inside horizontal enhanced surface
        tubing)

L15  ANSWER 103 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1996:359382  CAPLUS
DN   125:13759
OREF 125:2871a,2874a
ED   Entered STN:  20 Jun 1996
TI   Apparatus for liquefaction of gases and gas mixtures by physical
     condensation
IN   Landahl, Claus-Dieter; Landahl, Horst; Mantei, Roland
PA   Bresch Entsorgung GmbH, Germany
SO   Ger. Offen., 8 pp.
     CODEN: GWXXBX
DT   Patent
LA   German
IC   ICM  F25J003-08
CC   45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   DE 4436384           A1    19960418    DE 1994-4436384        19941012
     DE 4436384           C2    19980212
     EP 716281            A2    19960612    EP 1995-116107         19951012
     EP 716281            A3    19960724
         R:  AT, BE, DE, DK, ES, FR, GB, IT, NL, SE
PRAI DE 1994-4436384      A     19941012
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
 --------------  -----  ----------------------------------------------
 DE 4436384      ICM    F25J003-08
                 IPCI   F25J0003-08 [ICM,6]
                 IPCR   F25J0003-06 [I,C*]; F25J0003-06 [I,A]; F25J0003-08
                        [I,C*]; F25J0003-08 [I,A]
                 ECLA   F25J003/06; F25J003/08
 EP 716281       IPCI   F25J0003-08 [ICM,6]
                 IPCR   F25J0003-06 [I,C*]; F25J0003-06 [I,A]; F25J0003-08
                        [I,C*]; F25J0003-08 [I,A]
AB   The title apparatus, especially useful for liquefaction of CFCl3 (R11)
recovered from
     crushed polyurethane foam, comprises (1) a sep. loop for cooling
     of a refrigerant, specifically CHF3 or CF3CH2F, (2) a
     refrigeration system for gases or gas mixts., (3) a device for
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pre-cooling which includes a heat exchanger, and (4) ≥2 devices for
deep cooling of these gases and mixts. A schematic flow diagram of the
process is included.

ST refrigerant trifluoromethane gas liquefaction app; fluoromethane refrigerant gas liquefaction app; fluorotrichloromethane liquefaction app; liquefaction fluorotrichloromethane app tetrafluoroethane refrigerant; fluoroethane refrigerant fluorotrichloromethane liquefaction app

IT Liquefaction
(of fluorotrichloromethane from mixts. with air; apparatus for liquefaction of gases and gas mixts. by phys. condensation)

IT Refrigeration
(agents, fluoroalkanes; apparatus for liquefaction of gases and gas mixts. by phys. condensation)

IT 75-69-4P, Fluorotrichloromethane
RL: PEP (Physical, engineering or chemical process); PUR (Purification or recovery); PREP (Preparation); PROC (Process)
(liquefaction of, for recovery from crushed polyurethane foam ; apparatus for liquefaction of gases and gas mixts. by phys. condensation)

IT 75-10-5, Difluoromethane 75-46-7 354-33-6, 1,1,1,2,2-Pentafluoroethane 420-46-2, 1,1,1-Trifluoroethane 421-48-7, 1,1,1,2-Tetrafluoropropane 811-97-2, 1,1,1,2-Tetrafluoroethane
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(refrigerant; apparatus for liquefaction of gases and gas mixts. by phys. condensation)

L15 ANSWER 104 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1996:353705 CAPLUS
DN 125:145952
OREF 125:27267a,27270a
ED Entered STN: 19 Jun 1996
TI Calculation of boiling density of new refrigerants and their mixtures with volume-transformed equations of state
AU Nagel, M.; Bier, K.
CS Inst. Tech. Thermodyn. Kaeltetech., Univ. Karlsruhe, Karlsruhe, D-76128, Germany
SO DKV-Tagungsbericht (1995), 22nd(2, Pt. 1), 179-197
CODEN: DKVTDW; ISSN: 0172-8849
PB Deutscher Kaelte- und Klimatechnischer Verein
DT Journal
LA German
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 69

AB Simple cubic state equations were extended by a volumetric extension to calculate the boiling d. of pure refrigerants and their mixts. in the temperature range of 0.55-0.88 of the critical temperature (Tc), which is relevant for refrigeration technique. For this purpose, the specific parameters of the pure components were adapted to exactly measured critical state variables, to vapor pressure in a larger temperature range, and to 2 measured boiling d. at 0.6 and 0.8 of Tc. Exptl. data of Tc, critical pressure, and boiling pressure at 0.7 Tc of a single mixture of medium composition were used to describe the real mixing behavior of binary systems, but no exptl. data on their boiling d. Boiling d. calculated by the presented method agreed well with exptl. data.

ST refrigerant mixt boiling density simulation

IT Density
Simulation and Modeling, physicochemical
(calcn. of boiling d. of refrigerants and their mixts. with volume-transformed state equation)

IT Refrigeration

(agents, calcn. of boiling d. of refrigerants and their mixts. with
volume-transformed state equation)
IT 75-10-5, R32 75-37-6, R152a 75-45-6, R22 75-68-3, R142b
354-33-6, R125 420-46-2, R143a 811-97-2, R134a
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(calcn. of boiling d. of refrigerants and their mixts. with
volume-transformed state equation)

L15 ANSWER 105 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1996:353703 CAPLUS
DN 125:145950
OREF 125:27267a,27270a
ED Entered STN: 19 Jun 1996
TI Heat transfer at boiling of mixed refrigerants R 404A and R 407C in
submerged evaporators
AU Luke, Andrea; Koester, Ralf; Kaupmann, Paul; Huebner, Peter; Gorenflo,
Dieter
CS Inst. Waerme- Kaeltetech., Univ.-Gesamthochschule Paderborn, Paderborn,
D-33098, Germany
SO DKV-Tagungsbericht (1995), 22nd(2, Pt. 1), 143-158
CODEN: DKVTDW; ISSN: 0172-8849
PB Deutscher Kaelte- und Klimatechnischer Verein
DT Journal
LA German
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 69
AB The heat transfer of ternary refrigerant mixts. R404a and R407c at
nucleate boiling with free convection was measured at the outer ground
surface of a horizontal Cu tube at 50, 20, and 10% of the critical pressure.
The results at lowest boiling temps. of -6 to -9°, are by
.apprx.10% higher than literature data for R502 and by .apprx.10% lower
than literature data for R22 in the case of R404a and R407c, resp. Values
for the mixts. calculated according to E.U. Schluender (1982) agree well with
these exptl. data, although because of lack of exptl. heat transfer
coeffs. of the pure components, values according to the correlation of W.
Leiner (1994) were used. Values calculated by the same method for evaporation
at
-40° show a scarcely smaller difference between R404a and R502 than
at -6°, whereas the difference between R407c and R22 almost
disappears.
ST nucleate boiling heat transfer ternary refrigerant; evaporator submerged
heat transfer refrigerant mixt
IT Boiling
(heat transfer at boiling of mixed refrigerants in submerged
evaporators with copper tube)
IT Refrigeration
(agents, heat transfer at boiling of mixed refrigerants in submerged
evaporators with copper tube)
IT Hydrocarbons, properties
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(chloro, heat transfer at boiling of mixed refrigerants in submerged
evaporators with copper tube)
IT Heat transfer
(nucleate-boiling, heat transfer at boiling of mixed refrigerants in
submerged evaporators with copper tube)
IT 74-98-6, Propane, properties 75-10-5, R32 75-28-5, Isobutane
75-45-6, R22 106-97-8, Butane, properties 354-33-6, R125
420-46-2, R143a 811-97-2, R134a 39432-81-0, R502
150743-07-0, R404A 158675-78-6, R407C
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(heat transfer at boiling of mixed refrigerants in submerged
evaporators with copper tube)

IT   7440-50-8, Copper, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (heat transfer at boiling of mixed refrigerants in submerged
        evaporators with copper tube)

L15 ANSWER 106 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1996:334787 CAPLUS
DN   125:89998
OREF 125:16915a,16918a
ED   Entered STN: 08 Jun 1996
TI   Energetic evaluation of fluorinated hydrocarbon mixtures as alternative to
     R22
AU   Ahnefeld, Gerhard; Vollmer, Dietrich; Wobst, Eberhard
CS   Inst. Luft- Kaeltetech. g.G.m.b.H., Dresden, Germany
SO   Ki Luft- und Kaeltetechnik (1996), 32(5), 202-208
     CODEN: KLKAE5; ISSN: 0945-0459
PB   Verlag C. F. Mueller
DT   Journal
LA   German
CC   48-5 (Unit Operations and Processes)
AB   The performance of refrigerating plants operating with different
     blends of fluorinated hydrocarbons (R 407A, R 407B, R 407C, 404A, and R
     507) was measured under constant external conditions (temperature difference 5
K
     between refrigerant and heat carrier, constant refrigerating
     capacity). Losses up to 20% compared with the energetic performance of a
     plant operated with R22 were observed R 407A and R407C exhibited the highest
     deviations between theor. calcns. and experiment results due to an increased
     temperature glide of the condensing refrigerant caused by pressure drop and
     subcooling. Installation of an internal heat exchanger improved the
     performance at blends with a higher R125 content.
ST   refrigerant R22 substitution blend performance detn
IT   420-46-2, R143a
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (refrigerant containing R 125 and; energetic evaluation of fluorinated
        hydrocarbon mixts. as substitute for R22)
IT   75-45-6, R22
     RL: TEM (Technical or engineered material use); USES (Uses)
        (refrigerant; energetic evaluation of fluorinated hydrocarbon mixts. as
        substitute for)
IT   150743-07-0, R404A   158675-78-6, R 407A
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (refrigerant; energetic evaluation of fluorinated hydrocarbon mixts. as
        substitute for R22)
IT   75-10-5, R 32, Refrigerant
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (refrigerants containing R 125 and R 134a and; energetic evaluation of
        fluorinated hydrocarbon mixts. as substitute for R22)
IT   354-33-6, R125
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (refrigerants containing R 32 and R 134a and; energetic evaluation of
        fluorinated hydrocarbon mixts. as substitute for R22)
IT   811-97-2, R 134a
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (refrigerants containing R 32 and R R 125 and; energetic evaluation of
        fluorinated hydrocarbon mixts. as substitute for R22)

L15 ANSWER 107 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1996:312056 CAPLUS
DN   124:353268
OREF 124:65393a,65396a
ED   Entered STN: 28 May 1996
TI   A new cubic equation of state for refrigerants
AU   Wu, Zhichun; Ma, Yitai; Lu, Canren; Gao, Zhiming; Wang, Huixin
CS   Thermal Energy Research Institute, Tianjin Univ., Tianjin, 300072, Peop. Rep. China
SO   Gongcheng Rewuli Xuebao (1996), 17(1), 1-4
     CODEN: KCJPDF; ISSN: 0253-231X
PB   Kexue
DT   Journal
LA   Chinese
CC   65-6 (General Physical Chemistry)
     Section cross-reference(s): 48
AB   A new cubic equation of state for refrigerants based on "hard-sphere fluid" model was presented. The equation can be used for evaluation of volumetric properties in the saturated region with improved accuracy for polar and non-polar fluids. The thermodn. properties of 42 refrigerants were calculated, and were compared with those calculated by using P-R and P-T equations.
ST   cubic equation state thermodn property refrigerant
IT   Refrigeration
        (agents, cubic equation of state for refrigerants)
IT   Equation of state
        (cubic, cubic equation of state for refrigerants)
IT   74-82-8, Methane, properties   74-84-0, Ethane, properties   74-85-1, Ethylene, properties   74-98-6, Propane, properties 75-10-5, R 32 (Refrigerant)   75-19-4, RC 270   75-28-5, Iso-Butane   75-37-6, R 152a   75-43-4, R 21   75-45-6   75-46-7, R 23   75-63-8, BromoTrifluoromethane   75-68-3, R 142b   75-69-4, R 11   75-71-8, R 12 (Refrigerant)   75-72-9, R 13 (Refrigerant)   75-73-0, R 14 (Refrigerant)   76-13-1, R 113   76-14-2, R 114   76-15-3, R 115   106-97-8, Butane, properties   115-25-3, RC 318   124-38-9, Carbon dioxide, properties   306-83-2, R 123 354-33-6, R 125   359-35-3, R 134 420-46-2, R 143a   422-56-0, R 225Ca   507-55-1, R 225Cb 811-97-2, R 134a   1717-00-6, R 141b   2837-89-0, R 124   7440-37-1, Argon, properties   7446-09-5, Sulfur dioxide, properties   7664-41-7, Ammonia, properties   7727-37-9, Nitrogen, properties   7732-18-5, Water, properties   7782-44-7, Oxygen, properties   39432-81-0, R 502   56275-41-3, R 500   109207-22-9, E 134
     RL: PRP (Properties)
        (cubic equation of state for refrigerants)

L15 ANSWER 108 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1996:290349 CAPLUS
DN   124:320731
OREF 124:59399a,59402a
ED   Entered STN: 16 May 1996
TI   Refrigerant compositions
IN   Powell, Richard Llewellyn; Corr, Stuart; Murphy, Frederick Thomas; Morrison, James David
PA   Imperial Chemical Industries Plc, UK
SO   PCT Int. Appl., 53 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM C09K005-04
CC   48-5 (Unit Operations and Processes)
     Section cross-reference(s): 59
FAN.CNT 1
     PATENT NO.   KIND   DATE   APPLICATION NO.   DATE

PI	WO 9603473	A1	19960208	WO 1995-GB1737	19950724
	W: AU, BR, CA, JP, KR, US				
	RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	CA 2195411	A1	19960208	CA 1995-2195411	19950724
	CA 2195411	C	20060613		
	AU 9529887	A	19960222	AU 1995-29887	19950724
	AU 698733	B2	19981105		
	EP 772659	A1	19970514	EP 1995-925949	19950724
	EP 772659	B1	20010919		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE				
	BR 9508347	A	19970930	BR 1995-8347	19950724
	JP 10503230	T	19980324	JP 1996-505577	19950724
	JP 3916250	B2	20070516		
	AT 205872	T	20011015	AT 1995-925949	19950724
	ES 2163520	T3	20020201	ES 1995-925949	19950724
	PT 772659	T	20020228	PT 1995-925949	19950724
PRAI	GB 1994-15140	A	19940727		
	WO 1995-GB1737	W	19950724		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 9603473	ICM	C09K005-04
	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C07C0009-00 [I,C*]; C07C0009-08 [I,A]; C07C0009-14 [I,A]; C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
CA 2195411	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]
	IPCR	C09K0005-00 [I,C]; C09K0005-04 [I,A]
AU 9529887	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C07C0009-00 [I,C*]; C07C0009-08 [I,A]; C07C0009-14 [I,A]; C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]
EP 772659	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C07C0009-00 [I,C*]; C07C0009-08 [I,A]; C07C0009-14 [I,A]; C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]
BR 9508347	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C07C0009-00 [I,C*]; C07C0009-08 [I,A]; C07C0009-14 [I,A]; C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]
JP 10503230	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]; C07C0009-08 [I,A]; C07C0009-14 [I,A]; C07C0009-00 [I,C*]; C07C0019-08 [I,A]; C07C0019-00 [I,C*]
AT 205872	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
	IPCR	C07C0009-00 [I,C*]; C07C0009-08 [I,A]; C07C0009-14 [I,A]; C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]
ES 2163520	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
	IPCR	C07C0009-00 [I,C*]; C07C0009-08 [I,A]; C07C0009-14 [I,A]; C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]
PT 772659	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
	IPCR	C07C0009-00 [I,C*]; C07C0009-08 [I,A]; C07C0009-14 [I,A]; C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]

AB Compns. for use in a heat-transfer device such as a refrigeration or air conditioning system comprise ≥1 hydrofluorocarbon selected from CH_2F_2 (R-32) and CF_3CH_3 (R-143a); CHF_5 (R-125); ≥1 hydrocarbon (C_3H_8 and/or pentane); and optionally ≥1 hydrofluorocarbon selected from CF_3CH_2F (R-134a) and CHF_2CHF_2 (R-134).

ST   refrigerant hydrofluorocarbon hydrocarbon; difluoromethane trifluoroethane
     pentafluoroethane hydrocarbon tetrafluoroethane refrigerant; methane
     difluoro ethane fluoro refrigerant; propane pentane hydrofluorocarbon
     refrigerant; air conditioning refrigerant compn
IT   Air conditioning
        (hydrocarbon and hydrofluorocarbon refrigerant for)
IT   Refrigeration
        (agents, hydrocarbon and hydrofluorocarbon)
IT   74-98-6, Propane, uses 75-10-5, R-32   109-66-0, Pentane, uses
     354-33-6, R-125   359-35-3, R-134 420-46-2, R-143a
     811-97-2, R-134a
     RL: DEV (Device component use); USES (Uses)
        (refrigerant compns. containing)

L15 ANSWER 109 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1996:290348 CAPLUS
DN   124:320730
OREF 124:59399a,59402a
ED   Entered STN: 16 May 1996
TI   Refrigerant compositions
IN   Powell, Richard Llewllyn; Corr, Stuart; Murphy, Frederick Thomas;
     Morrison, James David
PA   Imperial Chemical Industries Plc, UK
SO   PCT Int. Appl., 13 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM C09K005-04
CC   48-5 (Unit Operations and Processes)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9603472	A1	19960208	WO 1995-GB1717	19950720
	W: AU, BR, CA, JP, KR, US				
	RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	AU 9529874	A	19960222	AU 1995-29874	19950720
PRAI	GB 1994-15076	A	19940627		
	WO 1995-GB1717	W	19950720		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 9603472	ICM	C09K005-04
	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
AU 9529874	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]

AB   The compns. comprise ≥1 hydrofluorocarbon selected from CH_2F_2
     (R-32) and CF_3CH_3 (R-143a); CHF_5 (R-125); C_3F_8 (R-218); and optionally
     ≥1 hydrofluorocarbon selected from CF_3CH_2F (R-134a) and CHF_2CHF_2
     (R-134).
ST   refrigerant hydrofluorocarbon; difluoromethane trifluoroethane
     pentafluoroethane perfluoropropane tetrafluoroethane refrigerant; methane
     difluoro propane perfluoro refrigerant; ethane fluoro propane perfluoro
     refrigerant
IT   Refrigeration
        (agents, hydrofluorocarbon)
IT   75-10-5, R-32   76-19-7, R-218 354-33-6, R-125
     359-35-3, R-134 420-46-2, R-143a 811-97-2, R-134a
     RL: TEM (Technical or engineered material use); USES (Uses)
        (refrigerant compns. containing)

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L15  ANSWER 110 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1996:273755  CAPLUS
DN   124:321249
OREF 124:59475a,59478a
ED   Entered STN:  11 May 1996
TI   Refrigerants
IN   Oomure, Yukio; Noguchi, Masahiro; Fujiwara, Katsuki; Momota, Hiroshi
PA   Daikin Ind Ltd, Japan
SO   Jpn. Kokai Tokkyo Koho, 5 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C09K005-04
     ICS  F25B001-00
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   JP 08048971          A     19960220    JP 1995-183640         19950720
     JP 2795224           B2    19980910
PRAI JP 1995-183640             19950720
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 JP 08048971     ICM    C09K005-04
                 ICS    F25B001-00
                 IPCI   C09K0005-04 [ICM,6]; F25B0001-00 [ICS,6]
                 IPCR   F25B0001-00 [I,C*]; F25B0001-00 [I,A]; C09K0005-00
                         [I,C*]; C09K0005-04 [I,A]
AB   The refrigerants essentially contain (1) HFC 32, HFC 134a, and HFC 143a
     (other than compns. containing HFC 32 1-45, HFC 134a 30-80, and HFC 143a
     0-70%), (2) HFC 32, HFC 125, and HFC 143a, (3) HFC 134a, HFC 143a, and HFC
     152a, (4) HFC 32, HFC 134a, and HFC 152a, or (5) HFC 32, HFC 125, and HFC
     134a (other than the compns. containing HFC 32 ≤60, HFC 125 ≤85,
     and HFC 134a 15-80%).
ST   refrigerant hydrofluorocarbon mixt
IT   Refrigeration
        (agents, refrigerants containing 3 types of hydrofluorocarbons)
IT   75-10-5, HFC 32   75-37-6, HFC 152a 354-33-6, HFC 125
     420-46-2, HFC 143a 811-97-2, HFC 134a
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (refrigerants containing 3 types of hydrofluorocarbons)

L15  ANSWER 111 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1996:268327  CAPLUS
DN   124:293413
OREF 124:54327a,54330a
ED   Entered STN:  08 May 1996
TI   Nonazeotropic (azeotropic) refrigerant compositions
IN   Powell, Richard Llewellyn; Corr, Stuart; Murphy, Frederick Thomas;
     Morrison, James David
PA   Imperial Chemical Industries Plc, UK
SO   PCT Int. Appl., 15 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM  C09K005-04
CC   48-5 (Unit Operations and Processes)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
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PI   WO 9602603           A1    19960201    WO 1995-GB1592         19950706
         W:  AU, BR, CA, JP, KR, US
         RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE
     AU 9528048           A     19960216    AU 1995-28048          19950706
PRAI GB 1994-14136        A     19940713
     WO 1995-GB1592       W     19950706
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
 --------------  -----  ----------------------------------------------
 WO 9602603      ICM    C09K005-04
                 IPCI   C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
                 ECLA   C09K005/04B4B
 AU 9528048      IPCI   C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
AB   The compns. comprise (i) a 1st component comprising fluoromethane (R-41);
     (ii) a 2nd component comprising ≥1 hydrofluorocarbon selected from
     1,1,1,2-tetrafluoroethane (R-134a) and 1,1,2,2-tetrafluoroethane (R-134);
     and optionally (iii) a 3rd component comprising ≥1
     hydrofluorocarbon selected from difluoromethane (R-32),
     1,1,1-trifluoroethane (R-143a) and pentafluoroethane (R-125).
ST   refrigerant nonazeotropic compn fluoromethane tetrafluoroethane;
     difluoromethane fluoromethane nonazeotropic refrigerant compn;
     trifluoroethane fluoromethane nonazeotropic refrigerant compn;
     pentafluoroethane fluoromethane nonazeotropic refrigerant compn; methane
     fluoro difluoro nonazeotropic refrigerant compn; ethane tetrafluoro
     trifluoro pentafluoro refrigerant compn
IT   Refrigeration
        (agents, compns. of nonazeotropic (azeotropic))
IT   75-10-5, R 32 354-33-6, R 125   359-35-3, R 134
     420-46-2, R 143a   593-53-3, R 41 811-97-2, R 134a
     RL: TEM (Technical or engineered material use); USES (Uses)
        (nonazeotropic (azeotropic) refrigerant compns. containing)

L15  ANSWER 112 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1996:262757  CAPLUS
DN   124:293410
OREF 124:54327a,54330a
ED   Entered STN:  04 May 1996
TI   Refrigerant compositions containing carbon dioxide and hydrofluorocarbons
IN   Powell, Richard Llewellyn; Corr, Stuart; Murphy, Frederick Thomas;
     Morrison, James David
PA   Imperial Chemical Industries Plc, UK
SO   PCT Int. Appl., 29 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM  C09K005-04
CC   48-5 (Unit Operations and Processes)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   WO 9602606           A1    19960201    WO 1995-GB1596         19950706
         W:  AU, BR, CA, JP, KR, US
         RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE
     CA 2193636           A1    19960201    CA 1995-2193636        19950706
     AU 9528050           A     19960216    AU 1995-28050          19950706
     AU 692567            B2    19980611
     EP 770113            A1    19970502    EP 1995-923512         19950706
     EP 770113            B1    19990421
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE
     BR 9508273           A     19971125    BR 1995-8273           19950706
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	JP 10502956	T	19980317	JP 1995-504783	19950706
	AT 179203	T	19990515	AT 1995-923512	19950706
	ES 2131320	T3	19990716	ES 1995-923512	19950706
PRAI	GB 1994-14133	A	19940713		
	WO 1995-GB1596	W	19950706		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 9602606	ICM	C09K005-04
	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
CA 2193636	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
AU 9528050	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
EP 770113	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
BR 9508273	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
JP 10502956	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
AT 179203	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
ES 2131320	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]

AB A nonazeotropic refrigerant composition comprises CO_2 2-25 weight%, ≥1 hydrofluorocarbon 15-96 weight% selected from 1,1,1,2-tetrafluoroethane (R 134a) and 1,1,2,2-tetrafluoroethane (R 134), and ≥1 hydrofluorocarbon 2-60 weight% selected from difluoromethane (R 32), 1,1,1-trifluoroethane (R 143a) and pentafluoroethane (R 125). The refrigerant composition is a replacement for R 22 in air conditioning systems and for R 502 in low-temperature refrigeration processes.

ST refrigerant carbon dioxide hydrofluorocarbon; R134a R134 R32 R143a R125 refrigerant

IT Refrigeration
(agents, refrigerant compns. containing CO_2 and hydrofluorocarbons)

IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoro, refrigerant compns. containing CO_2 and hydrofluorocarbons)

IT 354-33-6, Pentafluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(R 125; refrigerant compns. containing CO_2 and hydrofluorocarbons)

IT 359-35-3, 1,1,2,2-Tetrafluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(R 134; refrigerant compns. containing CO_2 and hydrofluorocarbons)

IT 811-97-2, 1,1,1,2-Tetrafluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(R 134a; refrigerant compns. containing CO_2 and hydrofluorocarbons)

IT 420-46-2, 1,1,1-Trifluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(R 143a; refrigerant compns. containing CO_2 and hydrofluorocarbons)

IT 75-10-5, Difluoromethane
RL: TEM (Technical or engineered material use); USES (Uses)
(R 32; refrigerant compns. containing CO_2 and hydrofluorocarbons)

IT 124-38-9, Carbon dioxide, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(refrigerant compns. containing CO_2 and hydrofluorocarbons)

L15 ANSWER 113 OF 175 CAPLUS

AN 1996:225164 CAPLUS

DN 124:264515

```
OREF 124:48923a,48926a
ED   Entered STN:  17 Apr 1996
TI   Development of engineering design data for new refrigerants. I: Pure
     fluids and azeotropic mixtures
AU   Hewitt, N. J.; McMullan, J. T.; Mongey, B.; Evans, R. H.
CS   School Environmental Studies, University Ulster, Coleraine, BT52 1SA, UK
SO   International Journal of Energy Research (1996), 20(2), 143-55
     CODEN: IJERDN; ISSN: 0363-907X
PB   Wiley
DT   Journal
LA   English
CC   48-5 (Unit Operations and Processes)
AB   It is important to correlate thermodn. data for replacements for CFCs and
     HCFCs and present it in a form that will allow industry to design
     equipment from charts rather than complicated thermodn. equations.  The
     development is outlined of such equations for the more popular of these
     fluids.  Sample pressure-enthalpy diagrams are then given for the pure
     fluids.  In addition, since replacements for CFCs and HCFCs can be formed
     from both zeotropic and azeotropic mixts. of these fluids, the use of a
     typical mixing rule is discussed and initial results presented.
ST   pure refrigerant engineering design data; azeotropic refrigerant mixt
     engineering design data
IT   Refrigeration
        (agents, development of engineering design data for pure and azeotropic
        mixts. of replacement refrigerants)
IT   75-10-5, r 32, Refrigerant 354-33-6, r 125
     420-46-2, r 143a 811-97-2, r 134a   2837-89-0, r 124
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (development of engineering design data for pure and azeotropic mixts.
        of replacement refrigerants)

L15  ANSWER 114 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1996:188975  CAPLUS
DN   124:206229
OREF 124:38041a,38044a
ED   Entered STN:  03 Apr 1996
TI   Environmentally acceptable refrigerants for medium-to-low-temperature
     refrigeration
IN   D'Aubarede, Bruno; Balthasart, Dominique; Paulus, Mireille; Barthelemy,
     Pierre; Koenig, Holger; Lecroc, Dominique; Vogel, Jean-Pierre; Buchwald,
     Hans; Doering, Reinhold; Hellmann, Joachim
PA   Solvay et Cie., Belg.
SO   PCT Int. Appl., 29 pp.
     CODEN: PIXXD2
DT   Patent
LA   French
IC   ICM  C09K005-04
CC   48-5 (Unit Operations and Processes)
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
     ---------------     ----   --------   --------------------   --------
PI   WO 9601882           A1    19960125   WO 1995-EP2635         19950706
         W:  AM, AU, BB, BG, BR, BY, CA, CN, CZ, EE, FI, GE, HU, IS, JP, KG,
             KP, KR, KZ, LK, LR, LT, LV, MD, MG, MN, MX, NO, NZ, PL, RO, RU,
             SG, SI, SK, TJ, TT, UA, US, UZ, VN
         RW: KE, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT,
             LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE,
             SN, TD, TG
     BE 1008474           A3    19960507   BE 1994-646            19940711
     BE 1008530           A6    19960604   BE 1995-284            19950330
     DE 19511444          A1    19961002   DE 1995-19511444       19950330
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CA 2194704	A1	19960125	CA 1995-2194704	19950706
AU 9529278	A	19960209	AU 1995-29278	19950706
AU 694975	B2	19980806		
EP 770114	A1	19970502	EP 1995-924982	19950706
EP 770114	B1	19981111		
R: AT, BE, CH, DE, DK, ES, FR, GB, IT, LI, NL, SE				
JP 10506131	T	19980616	JP 1995-504115	19950706
AT 173289	T	19981115	AT 1995-924982	19950706
ES 2127540	T3	19990416	ES 1995-924982	19950706
US 6054064	A	20000425	US 1997-765504	19970709

PRAI

BE 1994-646	A	19940711
BE 1995-284	A	19950330
DE 1995-19511444	A	19950330
WO 1995-EP2635	W	19950706

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 9601882	ICM	C09K005-04
	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
BE 1008474	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
BE 1008530	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
DE 19511444	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C07C0021-18 [ICS,6]; C07C0021-00 [ICS,6,C*]; C07C0019-08 [ICS,6]; C07C0019-00 [ICS,6,C*]; C07C0031-38 [ICS,6]; C07C0031-40 [ICS,6]; C07C0031-00 [ICS,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
CA 2194704	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
AU 9529278	IPCI	C09K0005-04; C09K0005-00 [C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
EP 770114	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
JP 10506131	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
AT 173289	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
ES 2127540	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
US 6054064	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	NCL	252/067.000; 062/114.000
	ECLA	C09K005/04B4B

AB The refrigerants comprise 1,1-difluoroethylene (R-1132a) and ≥1 hydrofluoroalkanes, particularly difluoromethane (R-32), trifluoromethane (R-23), 1,1-difluoroethane (R-152a), 1,1,1-trifluoroethane (R-143a), 1,1,1,2-tetrafluoroethane (R-134a) and/or pentafluoroethane (R-125).

ST refrigerant low medium temp environment inert; R1132a fluoroalkane low temp refrigerant; R32 R1132a low temp refrigerant; R23 R1132a low temp refrigerant; R152a R1132a low temp refrigerant; R134a R1132a low temp refrigerant; R143a R1132a low temp refrigerant; R125 R1132a low temp refrigerant

IT Refrigeration
(agents, environmentally acceptable refrigerants for medium-to-low-temperature refrigeration)

IT   75-38-7, R-1132a
     RL: NUU (Other use, unclassified); USES (Uses)
        (R-1132a; environmentally acceptable refrigerants for
        medium-to-low-temperature refrigeration)
IT   354-33-6, R 125
     RL: NUU (Other use, unclassified); USES (Uses)
        (R-125; environmentally acceptable refrigerants for
medium-to-low-temperature
        refrigeration)
IT   811-97-2, R 134a
     RL: NUU (Other use, unclassified); USES (Uses)
        (R-134a; environmentally acceptable refrigerants for
        medium-to-low-temperature refrigeration)
IT   420-46-2, R 143a
     RL: NUU (Other use, unclassified); USES (Uses)
        (R-143a; environmentally acceptable refrigerants for
        medium-to-low-temperature refrigeration)
IT   75-37-6, R 152a
     RL: NUU (Other use, unclassified); USES (Uses)
        (R-152a; environmentally acceptable refrigerants for
        medium-to-low-temperature refrigeration)
IT   75-46-7, R 23
     RL: NUU (Other use, unclassified); USES (Uses)
        (R-23; environmentally acceptable refrigerants for medium-to-low-temperature
        refrigeration)
IT   75-10-5, R 32
     RL: NUU (Other use, unclassified); USES (Uses)
        (R-32; environmentally acceptable refrigerants for medium-to-low-temperature
        refrigeration)

L15 ANSWER 115 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1996:148274 CAPLUS
DN   124:249231
OREF 124:45819a,45822a
ED   Entered STN: 14 Mar 1996
TI   Kovats Retention Indexes of Halocarbons on a Hexafluoropropylene
     Epoxide-Modified Graphitized Carbon Black
AU   Bruno, Thomas J.; Wertz, Kelly H.; Caciari, Michael
CS   Thermophysics Division, National Institute of Standards and Technology,
     Boulder, CO, 80303, USA
SO   Analytical Chemistry (1996), 68(8), 1347-59
     CODEN: ANCHAM; ISSN: 0003-2700
PB   American Chemical Society
DT   Journal
LA   English
CC   80-6 (Organic Analytical Chemistry)
     Section cross-reference(s): 45
AB   Kovats retention indexes of 97 halocarbons related to research on
     alternative refrigerants, propellants, foaming agents, and
     blowing agents were measured on a packed column stationary phase
     consisting of a 5% (mass/mass) coating of a low mol. weight polymer of
     hexafluoropropylene epoxide on graphitized carbon black. The measurements
     on each fluid were made at four temps., and the thermal dependence of the
     indexes was modeled with appropriate equations. The modeled values are
     suitable for the identification of these compds. by gas chromatog. on both
     laboratory and field instrumentation. The values are also useful for the
     optimization of more sophisticated analyses needed in specific situations.
     The stationary phase chosen will provide separation of nearly all the fluids of
     interest. Also, there is sufficient spread in the retention index values
     to facilitate fluid identification. The measurements also appear to fit a
     qual. triangular property diagram that was useful for classifying
     alternative refrigerant fluids and related compds.

ST   Kovats retention index halocarbon gas chromatog; graphitized carbon black
     hexafluoropropylene epoxide halocarbon
IT   Graphitized carbon black
     RL: ARU (Analytical role, unclassified); ANST (Analytical study)
        (Kovats retention indexes of halocarbons on hexafluoropropylene
        epoxide-modified graphitized carbon black)
IT   Molecular structure-property relationship
        (gas chromatog., Kovats retention indexes of halocarbons on
        hexafluoropropylene epoxide-modified graphitized carbon black)
IT   Hydrocarbons, analysis
     RL: ANT (Analyte); PRP (Properties); ANST (Analytical study)
        (halo, Kovats retention indexes of halocarbons on hexafluoropropylene
        epoxide-modified graphitized carbon black)
IT   Chromatography, gas
        (stationary phases, Kovats retention indexes of halocarbons on
        hexafluoropropylene epoxide-modified graphitized carbon black)
IT   428-59-1, Hexafluoropropylene epoxide
     RL: ARU (Analytical role, unclassified); ANST (Analytical study)
        (Kovats retention indexes of halocarbons on hexafluoropropylene
        epoxide-modified graphitized carbon black)
IT   74-87-3, R-40, analysis   75-00-3, R 160   75-02-5, R-1141 75-10-5
     , R-32   75-29-6, R-280Da   75-35-4, R-1130a, analysis   75-37-6, R-152a
     75-38-7   75-43-4, R-21   75-45-6, R-22   75-46-7, R-23   75-68-3, R-142b
     75-69-4, R-11   75-71-8, R-12   75-72-9, R-13   75-73-0, R-14   75-88-7,
     R-133a   76-13-1, R-113   76-14-2, R-114   76-15-3, R-115   76-16-4, R-116
     76-17-5, R-215Ba   76-18-6, R-217Ba   78-87-5, R-270Da   78-99-9, R-270Fb
     79-01-6, analysis   79-35-6, R-1112a   79-38-9   127-18-4,
     Tetrachloroethene, analysis   142-28-9, R-270Fa   151-67-7   156-59-2,
     cis-1,2-Dichloroethene   156-60-5, trans-1,2-Dichloroethene   306-83-2,
     R-123   311-81-9, R-1112c   338-75-0, R-243Db   353-36-6, R-161
     354-14-3, R-121   354-21-2, R-122   354-23-4, R-123a 354-33-6,
     R-125   354-53-0, R 114B1   354-58-5, 1,1,1-Trichlorotrifluoroethane
     354-64-3   359-08-0, R-1122B1   359-10-4, R-1122   359-11-5, R-1123
     359-28-4   359-29-5   359-35-3, R-134   374-07-2, R 114a   381-71-5,
     R-1112t 420-46-2, R-143a   421-07-8, R-263Fb   422-56-0, R-225Ca
     422-85-5, R-217CaB1   425-82-1   430-57-9, R-141   430-66-0, R-143
     431-63-0, R-236Ea   431-89-0, R-227Ea   460-35-5, 3-Chloro-1,1,1-
     trifluoropropane   460-43-5   460-73-1, R-245Fa   507-55-1, R-225Cb
     593-53-3, Fluoromethane   593-60-2, R-1140B1   594-20-7, R-270Aa
     624-72-6, 1,2-Difluoroethane   627-42-9, 2-Chloroethyl methyl ether
     661-97-2, R-216Ba   677-21-4   679-86-7, R-245Ca   690-39-1, R-236Fa
     754-34-7, 1-Iodoheptafluoropropane   811-95-0, 1,1,2-Trichloro-1-
     fluoroethane 811-97-2, R-134a   1599-41-3, R-215Aa   1649-08-7,
     R-132b   1691-17-4   1717-00-6, R-141b   1814-88-6, R-245Cb   1885-48-9,
     2-(Difluoromethoxy)-1,1,1-trifluoroethane   2252-84-8, R-227Ca   2314-97-8
     2317-91-1, R-1131a   2837-89-0, R-124   3822-68-2   13245-53-9,
     cis-1,2-Dichloro-1-fluoroethene   13245-54-0, trans-1,2-Dichloro-1-
     fluoroethene   13838-16-9, 2-Chloro-1,1,2-trifluoroethyl difluoromethyl
     ether   26675-46-7, 1-Chloro-2,2,2-trifluoroethyl difluoromethyl ether
     40723-63-5, R-254Cb   55605-86-2   57041-67-5   102738-79-4, R-262Da
     RL: ANT (Analyte); PRP (Properties); ANST (Analytical study)
        (halocarbons determination by gas chromatog. on hexafluoropropylene
        epoxide-modified graphitized carbon black stationary phase and Kovats
        retention indexes)

L15 ANSWER 116 OF 175 CAPLUS
AN   1996:40349 CAPLUS
DN   124:125392
OREF 124:23172h,23173a
ED   Entered STN: 20 Jan 1996
TI   The response of industries in replacing CFCs
AU   Yogamoorthi, A.

CS   Centre Futures Studies, Pondicherry University, Pondicherry, 605 014,
     India
SO   Ecology, Environment and Conservation (1995), 1(1-4), 91-6
     CODEN: EECOFT
PB   Enviro Media
DT   Journal
LA   English
CC   59-2 (Air Pollution and Industrial Hygiene)
     Section cross-reference(s): 53
AB   Chlorofluorocarbons (CFC) were developed in the late 1920s as an answer to
     the home refrigerator business. In 1940s they become the
     dominant refrigerant making wide-spread acceptance of household
     refrigeration possible. During 1950-1970s, CFC were widely
     applied. Only after a British investigator identified the hole in the O3
     layer over Antarctica and simultaneous research on the reaction behind O3
     depletion, did the world seek to find alternatives to replace the highly
     effective zone depletion substances derived from CFC. International
     achievements made to replace CFC through different substitutes with
     relatively lesser effect on the stratospheric O3 layer are described.
ST   industrial response chlorofluorocarbon substitute
IT   Detergents
     RL: TEM (Technical or engineered material use); USES (Uses)
        (Axarel; industrial response in replacing chlorofluorocarbons by other
        chems. to reduce ozone layer depletion and global warming)
IT   Hydrocarbons, occurrence
     RL: POL (Pollutant); TEM (Technical or engineered material use); OCCU
     (Occurrence); USES (Uses)
        (chloro fluoro, industrial response in replacing chlorofluorocarbons by
        other chems. to reduce ozone layer depletion and global warming)
IT   Hydrocarbons, occurrence
     RL: POL (Pollutant); TEM (Technical or engineered material use); OCCU
     (Occurrence); USES (Uses)
        (fluoro, industrial response in replacing chlorofluorocarbons by other
        chems. to reduce ozone layer depletion and global warming)
IT   Climate
        (greenhouse effect, industrial response in replacing
        chlorofluorocarbons by other chems. to reduce ozone layer depletion and
        global warming)
IT   10028-15-6, Ozone, processes
     RL: GOC (Geological or astronomical occurrence); REM (Removal or
     disposal); OCCU (Occurrence); PROC (Process)
        (industrial response in replacing chlorofluorocarbons by other chems.
        to reduce ozone layer depletion and global warming)
IT   75-10-5, HFC-32   75-37-6, HFC-152a   75-45-6, HCFC-22   75-68-3
     306-83-2, HCFC-123 354-33-6, HFC-125 420-46-2,
     HFC-143a 811-97-2, HFC-134a   1717-00-6, HCFC-141b   2837-89-0,
     HCFC-124   8045-35-0, Formacel   146732-63-0, MP 39   150743-07-0, HP 62
     173011-23-9, Capaphen   173047-77-3, Emkarox RL
     RL: TEM (Technical or engineered material use); USES (Uses)
        (industrial response in replacing chlorofluorocarbons by other chems.
        to reduce ozone layer depletion and global warming)

L15 ANSWER 117 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1995:977970 CAPLUS
DN   124:30465
OREF 124:5867a,5870a
ED   Entered STN: 12 Dec 1995
TI   Technological procedures for purification of refrigerants and
     fluoromonomers
AU   Nikiforov, B. L.; Barabanov, V. G.
CS   RNTs "Prikl. Khim.", St. Petersburg, Russia
SO   Zhurnal Prikladnoi Khimii (Sankt-Peterburg) (1995), 68(7), 1173-7

CODEN: ZPKHAB; ISSN: 0044-4618
PB   Nauka
DT   Journal
LA   Russian
CC   35-2 (Chemistry of Synthetic High Polymers)
     Section cross-reference(s): 45
AB   The recovery of refrigerants and fluoromonomers from reaction mixts. is discussed. Methods are proposed for separation of azeotropic mixts. of fluoro compds., removal of HF from reaction mixts., and deep purification of the products from toxic substances.
ST   fluoro refrigerant monomer purifn; sepn azeotrope fluoro compd; hydrogen fluoride removal reaction mixt; toxic substance removal fluoro compd
IT   Zeolites, uses
     RL: NUU (Other use, unclassified); USES (Uses)
        (CaEN-4B, adsorbents; methods for purification of fluoro refrigerants and monomers)
IT   Adsorbents
     Phase diagram
     Solubility
        (methods for purification of fluoro refrigerants and monomers)
IT   Monomers
     RL: PUR (Purification or recovery); PREP (Preparation)
        (methods for purification of fluoro refrigerants and monomers)
IT   Zeolites, uses
     RL: NUU (Other use, unclassified); USES (Uses)
        (CaA, adsorbents; methods for purification of fluoro refrigerants and monomers)
IT   Refrigeration
        (agents, methods for purification of fluoro refrigerants and monomers)
IT   Hydrocarbons, preparation
     RL: PUR (Purification or recovery); PREP (Preparation)
        (chloro fluoro, methods for purification of fluoro refrigerants and monomers)
IT   Hydrocarbons, preparation
     RL: PUR (Purification or recovery); PREP (Preparation)
        (fluoro, methods for purification of fluoro refrigerants and monomers)
IT   7440-44-0, SKT, uses
     RL: NUU (Other use, unclassified); USES (Uses)
        (adsorbents; methods for purification of fluoro refrigerants and monomers)
IT   75-10-5P, Difluoromethane   75-45-6P, Difluorochloromethane
     75-46-7P, Trifluoromethane   76-15-3P   115-25-3P, Perfluorocyclobutane
     116-14-3P, Tetrafluoroethylene, preparation   116-15-4P,
     Hexafluoropropylene 354-33-6P, Pentafluoroethane   359-10-4P,
     1,1-Difluorochloroethylene   359-11-5P, Trifluoroethylene
     420-46-2P, 1,1,1-Trifluoroethane 811-97-2P,
     1,1,1,2-Tetrafluoroethane   7664-39-3P, Hydrogen fluoride, preparation
     27987-06-0P, Trifluoroethane   63938-10-3P, Chlorotetrafluoroethane
     RL: PUR (Purification or recovery); PREP (Preparation)
        (methods for purification of fluoro refrigerants and monomers)

L15 ANSWER 118 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1995:966732 CAPLUS
DN   124:32769
OREF 124:6213a,6216a
ED   Entered STN: 06 Dec 1995
TI   Study of HFC substitutes used in the vortex compressor
AU   Chen, Zhilan; Qiao, Zongliang; Xiong, Zenan
CS   Xian Jiaotong Univ., Xian, Peop. Rep. China
SO   Zhileng Xuebao (1995), (1), 1-4
     CODEN: CLHPDE; ISSN: 0253-4339
PB   Zhongguo Zhileng Xuehui
DT   Journal

LA   Chinese
CC   48-5 (Unit Operations and Processes)
AB   According to the thermodn. process of vortex compressor, the
     refrigeration cycles for six HFC and two groups of mixed medium
     have been calculated It showed that the mixts. of R32/R134a with a suitable
     ratio is quite an ideal substitute for R22.
ST   vortex compressor refrigeration cycle; refrigerant substitute
     vortex compressor
IT   Compressors
     Thermodynamic cycle
        (refrigeration cycle of vortex compressor with substitute
        refrigerants)
IT   354-33-6, r 125
     RL: TEM (Technical or engineered material use); USES (Uses)
        (refrigeration cycle of vortex compressor with substitute
        refrigerant R 125)
IT   354-25-6, r 124a
     RL: TEM (Technical or engineered material use); USES (Uses)
        (refrigeration cycle of vortex compressor with substitute
        refrigerant R 12ra)
IT   811-97-2, r 134a
     RL: TEM (Technical or engineered material use); USES (Uses)
        (refrigeration cycle of vortex compressor with substitute
        refrigerant R 134a)
IT   420-46-2, r 143a
     RL: TEM (Technical or engineered material use); USES (Uses)
        (refrigeration cycle of vortex compressor with substitute
        refrigerant R 143a)
IT   75-10-5, r 32
     RL: TEM (Technical or engineered material use); USES (Uses)
        (refrigeration cycle of vortex compressor with substitute
        refrigerant R 32)

L15 ANSWER 119 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1995:947721 CAPLUS
DN   124:38226
OREF 124:7093a,7096a
ED   Entered STN: 29 Nov 1995
TI   Accurate vapor pressure equation for refrigerants
AU   Iglesias-Silva, Gustavo A.; Miller, Reid C.; Ceballos, Ana Diaz; Hall,
     Kenneth R.; Holste, James. C.
CS   Dep. Chem. Eng., Texas A&M Univ., College Station, TX, 77843-3122, USA
SO   Fluid Phase Equilibria (1995), 111(2), 203-12
     CODEN: FPEQDT; ISSN: 0378-3812
PB   Elsevier
DT   Journal
LA   English
CC   65-6 (General Physical Chemistry)
     Section cross-reference(s): 48
AB   This paper contains parameters for a universal vapor pressure equation
     describing methane, ethane, propane, n-butane, i-butane, R-11, R-12, R-22,
     R-23, R-32, R-123, R-124, R-125, R-134a, R-141b, R-142b, R-143a and
     R-152a. These parameters have been generated using exptl. vapor pressures
     reported in literature. The vapor pressure equation, based upon
     asymptotic behavior at the triple and critical points, has three adjustable
     fluid-dependent parameters. This equation describes the entire vapor
     pressure curve within the apparent accuracy of the exptl. values.
ST   vapor pressure hydrocarbon halocarbon refrigerant
IT   Hydrocarbons, properties
     RL: PRP (Properties)
        (accurate vapor pressure equation for hydrocarbon and halocarbon
        refrigerants)

IT   Refrigeration
        (agents, accurate vapor pressure equation for hydrocarbon and
        halocarbon refrigerants)
IT   Hydrocarbons, properties
     RL: PRP (Properties)
        (halo, accurate vapor pressure equation for hydrocarbon and halocarbon
        refrigerants)
IT   74-82-8, Methane, properties   74-84-0, Ethane, properties   74-98-6,
     Propane, properties 75-10-5, R-32   75-28-5, Isobutane
     75-37-6, R-152a   75-45-6, R-22   75-46-7, R-23   75-68-3, R-142b
     75-69-4, R-11   75-71-8, R-12   106-97-8, n-Butane, properties   306-83-2,
     R-123 354-33-6, R-125 420-46-2, R-143a
     811-97-2, R-134a   1717-00-6, R-141b   2837-89-0, R-124
     RL: PRP (Properties)
        (accurate vapor pressure equation for hydrocarbon and halocarbon
        refrigerants)

L15 ANSWER 120 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1995:830370 CAPLUS
DN   124:32460
OREF 124:6163a,6166a
ED   Entered STN: 04 Oct 1995
TI   Some thermophysical properties of the new refrigerants R32, R125, R134a,
     R142b, and R152a
AU   Kraft un, K.; Leipertz, A.
CS   Lehrstuhl fur Technische Thermodynamik (LTT), Universitat
     Erlangen-Nurnberg, Erlangen, Germany
SO   DKV-Tagungsbericht (1994), 21st(2, Pt. 1), 185-99
     CODEN: DKVTDW; ISSN: 0172-8849
PB   Deutscher Kaelte- und Klimatechnischer Verein
DT   Journal
LA   German
CC   45-5 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
AB   The thermal conductivity of and sound velocity in the title fluorohydrocarbon
     refrigerants could be determined by light scattering.
ST   fluorohydrocarbon refrigerant light scattering; thermal cond
     fluorohydrocarbon refrigerant
IT   Thermal conductivity and conduction
        (thermophys. properties of fluorohydrocarbon refrigerants determined by
        light scattering)
IT   Refrigeration
        (agents, thermophys. properties of fluorohydrocarbon refrigerants determined
        by light scattering)
IT   75-10-5, R 32   75-37-6, R 152a 354-33-6, R 125
     420-46-2, R 143a 811-97-2, R 134a
     RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)
        (thermophys. properties of fluorohydrocarbon refrigerants determined by
        light scattering)

L15 ANSWER 121 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1995:823681 CAPLUS
DN   123:291557
OREF 123:52113a,52116a
ED   Entered STN: 30 Sep 1995
TI   Compositions containing bisphenylhexafluoropropane alkylene oxide adducts
     and hydrofluorocarbons for refrigerator driving fluids
IN   Honda, Yoshihiro; Sawada, Hiroki
PA   Kao Corp, Japan
SO   Jpn. Kokai Tokkyo Koho, 7 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese

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IC   ICM  C10M169-04
ICI  C10M169-04, C10M105-54, C10M131-04; C10N030-08, C10N040-30
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   JP 07179877          A     19950718    JP 1993-347686         19931224
PRAI JP 1993-347686             19931224
CLASS
 PATENT NO.       CLASS  PATENT FAMILY CLASSIFICATION CODES
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 JP 07179877      ICM    C10M169-04
                  ICI    C10M169-04, C10M105-54, C10M131-04; C10N030-08,
                         C10N040-30
                  IPCI   C10M0169-04 [ICM,6]; C10M0169-04 [ICI,6]; C10M0169-00
                         [ICI,6,C*]; C10M0105-54 [ICI,6]; C10M0105-00
                         [ICI,6,C*]; C10M0131-04 [ICI,6]; C10M0131-00
                         [ICI,6,C*]; C10N0030-08 [ICI,6]; C10N0040-30 [ICI,6]
                  IPCR   C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10N0030-08
                         [N,A]
OS   MARPAT 123:291557
AB   The compns. comprise refrigerator oils containing
     R1O(R2O)nC6H4-p-C(CF3)2C6H4-p-O(R3O)mR4 (R1, R4 = C1-12 alkyl; R2, R3 =
     C2-4 alkylene; n = 0-20; m = 0-20) as base oils and hydrofluorocarbons.
     The hydrofluorocarbons may be difluoromethane (HFC 32), 1,1-difluoroethane
     (HFC 152a), 1,1,1-trifluoroethane (HFC 143a), 1,1,1,2-tetrafluoroethane
     (HFC 134a), 1,1,2,2-tetrafluoroethane (HFC 134), and/or pentafluoroethane
     (HFC 125).  The compns. have good compatibility and thermal stability.
ST   refrigerator fluid phenylfluoropropane alkylenoxide
     hydrofluorocarbon
IT   Halogen compounds
     RL: TEM (Technical or engineered material use); USES (Uses)
        (hydrofluorocarbons; refrigerator hydraulic fluids containing
        bisphenylhexafluoropropane alkylene oxide adducts and
        hydrofluorocarbons for compatibility and thermal stability)
IT   Hydraulic fluids
       Refrigerating apparatus
        (refrigerator hydraulic fluids containing
        bisphenylhexafluoropropane alkylene oxide adducts and
        hydrofluorocarbons for compatibility and thermal stability)
IT   Air conditioning
        (apparatus, refrigerator hydraulic fluids containing
        bisphenylhexafluoropropane alkylene oxide adducts and
        hydrofluorocarbons for compatibility and thermal stability)
IT   Alkanes, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro, refrigerator hydraulic fluids containing
        bisphenylhexafluoropropane alkylene oxide adducts and
        hydrofluorocarbons for compatibility and thermal stability)
IT   354-33-6, Pentafluoroethane
     RL: TEM (Technical or engineered material use); USES (Uses)
        (HFC 125; refrigerator hydraulic fluids containing
        bisphenylhexafluoropropane alkylene oxide adducts and
        hydrofluorocarbons for compatibility and thermal stability)
IT   359-35-3, 1,1,2,2-Tetrafluoroethane
     RL: TEM (Technical or engineered material use); USES (Uses)
        (HFC 134; refrigerator hydraulic fluids containing
        bisphenylhexafluoropropane alkylene oxide adducts and
        hydrofluorocarbons for compatibility and thermal stability)
IT   811-97-2, 1,1,1,2-Tetrafluoroethane
     RL: TEM (Technical or engineered material use); USES (Uses)
        (HFC 134a; refrigerator hydraulic fluids containing
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bisphenylhexafluoropropane alkylene oxide adducts and
hydrofluorocarbons for compatibility and thermal stability)

IT 420-46-2, 1,1,1-Trifluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(HFC 143a; refrigerator hydraulic fluids containing
bisphenylhexafluoropropane alkylene oxide adducts and
hydrofluorocarbons for compatibility and thermal stability)

IT 75-37-6, 1,1-Difluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(HFC 152a; refrigerator hydraulic fluids containing
bisphenylhexafluoropropane alkylene oxide adducts and
hydrofluorocarbons for compatibility and thermal stability)

IT 75-10-5, Difluoromethane
RL: TEM (Technical or engineered material use); USES (Uses)
(HFC 32; refrigerator hydraulic fluids containing
bisphenylhexafluoropropane alkylene oxide adducts and
hydrofluorocarbons for compatibility and thermal stability)

IT 135084-00-3P 137372-33-9P 169958-03-6P 169958-04-7P
RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(base oil; refrigerator hydraulic fluids containing
bisphenylhexafluoropropane alkylene oxide adducts and
hydrofluorocarbons for compatibility and thermal stability)

IT 64-67-5, Diethyl sulfate 77-78-1, Dimethyl sulfate 106-94-5, Propyl bromide 592-55-2, 2-Bromoethyl ethyl ether 1478-61-1, 2,2-Bis(4-hydroxyphenyl)hexafluoropropane
RL: RCT (Reactant); RACT (Reactant or reagent)
(refrigerator hydraulic fluids containing
bisphenylhexafluoropropane alkylene oxide adducts and
hydrofluorocarbons for compatibility and thermal stability)

L15 ANSWER 122 OF 175 CAPLUS

AN 1995:738968 CAPLUS
DN 123:204148
OREF 123:36275a,36278a
ED Entered STN: 16 Aug 1995
TI Lubricant refrigerant comprising composition containing fluorohydrocarbon
IN Katafuchi, Tadashi; Nakamura, Akira
PA Idemitsu Kosan Co., Ltd., Japan
SO U.S., 7 pp. Cont.-in-part of U.S. Ser. No. 18,136, abandoned.
CODEN: USXXAM
DT Patent
LA English
IC ICM C09K005-04
ICS C10M107-02; C10M107-34
INCL 252068000
CC 51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5431835	A	19950711	US 1994-176657	19940103
	JP 05295384	A	19931109	JP 1993-27906	19930217
PRAI	JP 1992-30528	A	19920218		
	JP 1993-27906	A	19930217		
	US 1993-18136	B2	19930218		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 5431835	ICM	C09K005-04
	ICS	C10M107-02; C10M107-34
	INCL	252068000
	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*];

C10M0107-02 [ICS,6]; C10M0107-34 [ICS,6]; C10M0107-00 [ICS,6,C*]
IPCR C10M0107-00 [I,C*]; C10M0107-00 [I,A]; C10M0111-00 [I,C*]; C10M0111-04 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]
NCL 508/579.000; 252/067.000
ECLA C10M107/00; C10M111/04; C10M169/04B; C10M171/00R
JP 05295384 IPCI C10M0169-04 [ICM,5]; C09K0005-04 [ICA,5]; C09K0005-00 [ICA,5,C*]; C10M0169-04 [ICI,5]; C10M0169-00 [ICI,5,C*]; C10M0105-04 [ICI,5]; C10M0105-06 [ICI,5]; C10M0105-00 [ICI,5,C*]; C10M0145-26 [ICI,5]; C10M0145-00 [ICI,5,C*]; C10M0155-02 [ICI,5]; C10M0155-00 [ICI,5,C*]; C10N0020-02 [ICI,5]; C10N0030-00 [ICI,5]; C10N0030-06 [ICI,5]; C10N0040-30 [ICI,5]
IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0107-00 [I,C*]; C10M0107-00 [I,A]; C10M0111-00 [I,C*]; C10M0111-04 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0030-00 [N,A]; C10N0030-06 [N,A]; C10N0040-30 [N,A]

AB A lubricant for refrigerating machines employing tetrafluoroethane or the like as a refrigerant comprises as an essential component a base oil comprising (A) 40-95 weight% of a synthetic oil composed of a poly-α-olefin and/or an ethylene/α-olefin copolymer or a mixture of an alkylbenzene and a poly-α-olefin and/or an ethylene/α-olefin copolymer and (B) 5-60 weight% of a fluidity improver composed of a polyoxyalkylene glycol compound, etc. The lubricant is used along with a refrigerant comprising a substituted Flon compound such as 1,1,1,2-tetrafluoroethane (R-134a), and is excellent in the performance such as wear resistance, elec. insulating properties, hydrolytic stability, nonhygroscopicity, etc. and also in returnability of the lubricant. The lubricant is especially effective when used in automobile or household air conditioners, refrigerators, etc. having high industrial usefulness.

ST lubricant refrigerant fluorohydrocarbon base fluid improver

IT Refrigerating apparatus
(Lubricant compns. containing fluorohydrocarbon refrigerants and base oils and polyoxyalkylene glycol fluid improver for)

IT Lubricating oil additives
(fluidity improvers; polyoxyalkylene glycols for compression-type refrigerating machines)

IT Alkenes, uses
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(C8-14 α-, polymers, base containing; Lubricant compns. containing fluorohydrocarbon refrigerants and base oils and polyoxyalkylene glycol fluid improver)

IT 71-43-2D, Benzene, alkyl derivs. 74-85-1D, Ethene, polymers with α-olefins 9010-79-1, Ethylene-propylene copolymer 25067-08-7, Poly(1-dodecene) 25068-25-1, Poly(1-octene) 25189-70-2, Poly(1-decene)
RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)
(base containing; Lubricant compns. containing fluorohydrocarbon refrigerants and)

IT 24991-61-5, Polypropylene glycol dimethyl ether 167075-91-4
RL: MOA (Modifier or additive use); NUU (Other use, unclassified); USES (Uses)
(fluid improver; Lubricant compns. containing fluorohydrocarbon refrigerants and base oils and)

IT   75-10-5, R 32 (Refrigerant) 354-33-6, R 125   359-35-3,
     R 134 420-46-2, R 143a 811-97-2, R 134a
     RL: NUU (Other use, unclassified); USES (Uses)
        (refrigerant; Lubricant compns. containing fluorohydrocarbon refrigerants
        and base oils and polyoxyalkylene glycol fluid improver)

L15 ANSWER 123 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1995:676110 CAPLUS
DN   123:86998
OREF 123:15497a,15500a
ED   Entered STN: 14 Jul 1995
TI   Component design issues and limitations with 3rd generation HFC, HC and
     natural refrigerants
AU   Biancardi, F. R.; Sienel, T. H.; Sibley, Howard
CS   United Technologies Research Center, East Hartford, CT, USA
SO   Science et Technique du Froid (1994), (1, New Applications of Natural
     Working Fluids in Refrigeration and Air Conditioning), 365-86
     CODEN: STFRD4; ISSN: 0151-1637
PB   Institut International du Froid
DT   Journal
LA   English
CC   48-5 (Unit Operations and Processes)
AB   Various benefits are examined and discussed of key Rankine cycle system and
     component design issues and limitations when using a wide range of single
     component refrigerants, hydrocarbons, natural refrigerants and blends by
     using computer modeling program, READER, for heating and cooling systems.
     The potential for using small high-speed centrifugal compressors to mech.
     these requirements and the state of the art are briefly described.
ST   hydrocarbon refrigerant component design limitation; natural refrigerant
     component design limitation; computer program RADER refrigerant thermodn
     cycle; heating cooling system refrigerant; air conditioning refrigerant
     thermodn cycle
IT   Hydrocarbons, uses
     RL: DEV (Device component use); TEM (Technical or engineered material
     use); USES (Uses)
        (component design issues and limitations with 3rd generation
        refrigerants)
IT   Computer program
     Thermodynamic cycle
        (computer program READER for modeling of thermodn. cycle of 3rd
        generation refrigerants)
IT   Air conditioning
        (heating and cooling; computer program READER for modeling of thermodn.
        cycle of 3rd generation refrigerants)
IT   Refrigeration
        (agents, component design issues and limitations with 3rd generation
        refrigerants)
IT   74-98-6, r 290, properties 75-10-5, r 32, Refrigerant   75-19-4,
     Rc 270   75-28-5, r 600a   75-37-6, r 152a   75-43-4, r 21, Refrigerant
     75-45-6, r 22   75-63-8, r 13B1   75-68-3, r 142b   75-69-4, r 11,
     Refrigerant   75-71-8, r 12, Refrigerant   76-13-1, r 113, Halocarbon
     76-14-2, r 114, Halocarbon   76-15-3, r 115   76-19-7, r 218   78-78-4,
     Isopentane   106-97-8, r 600, properties   109-66-0, Pentane, properties
     115-25-3, Rc 318   306-83-2, r 123   354-23-4, r 123a 354-33-6,
     r 125   359-35-3, r 134 420-46-2, r 143a   430-66-0, r 143
     431-63-0, r 236Ea   431-89-0, r 227Ea   460-73-1, r 245Fa   677-56-5, r
     236Cb   679-86-7, r 245Ca   690-39-1, r 236Fa 811-97-2, r 134a
     1717-00-6, r 141b   1814-88-6, r 245Cb   2252-84-8, r 227Ca   2837-89-0, r
     124   3257-28-1, e 125   7664-41-7, Ammonia, properties   7732-18-5,
     Water, properties   40723-63-5, r 254Cb   109207-22-9, e 134
     RL: DEV (Device component use); PRP (Properties); TEM (Technical or
     engineered material use); USES (Uses)

(computer program READER for modeling of thermodn. cycle of 3rd generation refrigerants)

L15 ANSWER 124 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1995:638646 CAPLUS
DN 123:87339
OREF 123:15545a,15548a
ED Entered STN: 27 Jun 1995
TI Hydrofluorocarbon (HFC) refrigerant compositions
IN Minor, Barbara H.; Bivens, Donald B.; Lunger, Brooks S.
PA E. I. Du Pont de Nemours & Co., USA
SO U.S., 34 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM C09K005-04
ICS C09K003-30; C11D007-50; C08J009-14
INCL 252067000
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 38, 51
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 5417871	A	19950523	US 1994-208777	19940311
	WO 9524451	A1	19950914	WO 1995-US3147	19950313
	W: JP				
	RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
	EP 749464	A1	19961227	EP 1995-913676	19950313
	EP 749464	B1	20010829		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, PT, SE				
	JP 09510249	T	19971014	JP 1995-523702	19950313
	JP 3237850	B2	20011210		
	EP 1118648	A2	20010725	EP 2001-102945	19950313
	EP 1118648	A3	20050126		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, PT				
	AT 204894	T	20010915	AT 1995-913676	19950313
	ES 2161872	T3	20011216	ES 1995-913676	19950313
	US 5672293	A	19970930	US 1995-435108	19950504
	US 5785883	A	19980728	US 1997-842164	19970423
	US 6001273	A	19991214	US 1998-14449	19980128
	US 6531441	B1	20030311	US 1999-384599	19990827
	JP 2001348565	A	20011218	JP 2001-110712	20010410
	JP 3838885	B2	20061025		
	US 20040014621	A1	20040122	US 2002-325309	20021220
	US 6846792	B2	20050125		
PRAI	US 1994-208777	A	19940311		
	EP 1995-913676	A3	19950313		
	JP 1995-523702	A3	19950313		
	WO 1995-US3147	W	19950313		
	US 1995-435108	A3	19950504		
	US 1997-842164	A3	19970423		
	US 1998-14449	A3	19980128		
	US 1999-384599	A3	19990827		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 5417871	ICM	C09K005-04
	ICS	C09K003-30; C11D007-50; C08J009-14
	INCL	252067000
	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C09K0003-30 [ICS,6]; C11D0007-50 [ICS,6]; C08J0009-14 [ICS,6]; C08J0009-00 [ICS,6,C*]

	IPCR	C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]
	NCL	252/067.000; 062/114.000; 252/008.000; 252/194.000; 252/364.000; 252/571.000; 510/408.000; 516/008.000; 516/010.000; 516/198.000
	ECLA	C08J009/14P; C09K003/30; C09K005/04B4B; C11D007/50D4; C11D007/50D4B
WO 9524451	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C09K0003-30 [ICS,6]; C08J0009-14 [ICS,6]; C08J0009-00 [ICS,6,C*]
	IPCR	C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]
	ECLA	C08J009/14P; C09K003/30; C09K005/04B4B; C11D007/50D4; C11D007/50D4B
EP 749464	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C09K0003-30 [ICS,6]; C08J0009-14 [ICS,6]; C08J0009-00 [ICS,6,C*]
	IPCR	C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]
JP 09510249	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C07C0019-08 [ICS,6]; C07C0019-00 [ICS,6,C*]
	IPCR	C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]
EP 1118648	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	ECLA	C09K005/04B4B; C11D007/50D4
AT 204894	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]; C09K0003-30 [ICS,7]; C08J0009-14 [ICS,7]; C08J0009-00 [ICS,7,C*]
	IPCR	C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]
ES 2161872	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]; C09K0003-30 [ICS,7]; C08J0009-14 [ICS,7]; C08J0009-00 [ICS,7,C*]
	IPCR	C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]
US 5672293	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C09K0003-30 [ICS,6]; C11O0007-50 [ICS,6]; C08J0009-14 [ICS,6]; C08J0009-00 [ICS,6,C*]
	IPCR	C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]
	NCL	252/067.000; 062/114.000; 062/324.100; 510/177.000;

510/408.000

	ECLA	C08J009/14P; C09K003/30; C09K005/04B4B; C11D007/50D4; C11D007/50D4B
US 5785883	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C09K0003-30 [ICS,6]; C11D0007-50 [ICS,6]; C08J0009-14 [ICS,6]; C08J0009-00 [ICS,6,C*]
	IPCR	C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]
	NCL	252/067.000; 062/114.000; 062/324.100; 510/177.000; 510/408.000
	ECLA	C09K003/30; C09K005/04B4B; C11D007/50D4; C11D007/50D4B
US 6001273	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]
	NCL	252/067.000; 062/114.000; 510/408.000
	ECLA	C09K003/30; C09K005/04B4B; C11D007/50D4
US 6531441	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
	IPCR	C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]
	NCL	510/408.000; 510/407.000; 510/410.000
	ECLA	C08J009/14P; C09K003/30; C09K005/04B4B; C11D007/50D4; C11D007/50D4B
JP 2001348565	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]; F25B0001-00 [I,A]
	IPCR	C07C0019-00 [I,C*]; C07C0019-08 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]
US 20040014621	IPCI	C11D0017-00 [ICM,7]
	IPCR	C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]
	NCL	510/177.000; 510/407.000; 510/408.000; 510/412.000; 510/415.000; 062/114.000; 252/067.000; 252/068.000; 521/131.000
	ECLA	C08J009/14P; C09K003/30; C09K005/04B4B; C11D007/50D4; C11D007/50D4B

AB Refrigerant compns. comprising pentafluoroethane 66-99 and cyclopropane 1-34 weight% are claimed. In examples, refrigerant performance, etc., was examined for HFC refrigerant compns. including mixts. of difluoromethane and isobutane, butane, propylene or cyclopropane; pentafluoroethane and propylene or cyclopropane; 1,1,2,2-tetrafluoroethane and propane; 1,1,1,2-tetrafluoroethane and cyclopropane; 1,1,1-trifluoroethane and DME or propylene; 1,1-difluoroethane and propane, isobutane, butane or cyclopropane; fluoroethane and propane or cyclopropane; 1,1,1,2,2,3,3-heptafluoropropane and butane, cyclopropane, DME, isobutane or propane; or 1,1,1,2,3,3,3-heptafluoropropane and butane, cyclopropane, isobutane or propane.

ST HFC hydrofluorocarbon refrigerant compn; cyclopropane pentafluoroethane HFC refrigerant

IT Refrigeration
(agents, hydrofluorocarbon refrigerant compns.)

IT 115-10-6, Dimethylether
RL: TEM (Technical or engineered material use); USES (Uses)
(DME; hydrofluorocarbon refrigerant compns.)

IT 354-33-6, Pentafluoroethane

RL: TEM (Technical or engineered material use); USES (Uses)
(HFC-125; hydrofluorocarbon refrigerant compns.)
IT 359-35-3, 1,1,2,2-Tetrafluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(HFC-134; hydrofluorocarbon refrigerant compns.)
IT 811-97-2, 1,1,1,2-Tetrafluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(HFC-134a; hydrofluorocarbon refrigerant compns.)
IT 420-46-2, 1,1,1-Trifluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(HFC-143a; hydrofluorocarbon refrigerant compns.)
IT 75-37-6, 1,1-Difluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(HFC-152a; hydrofluorocarbon refrigerant compns.)
IT 353-36-6, Fluoroethane
RL: TEM (Technical or engineered material use); USES (Uses)
(HFC-161; hydrofluorocarbon refrigerant compns.)
IT 2252-84-8, 1,1,1,2,2,3,3-Heptafluoropropane
RL: TEM (Technical or engineered material use); USES (Uses)
(HFC-227ca; hydrofluorocarbon refrigerant compns.)
IT 431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane
RL: TEM (Technical or engineered material use); USES (Uses)
(HFC-227ea; hydrofluorocarbon refrigerant compns.)
IT 75-10-5, Difluoromethane
RL: TEM (Technical or engineered material use); USES (Uses)
(HFC-32; hydrofluorocarbon refrigerant compns.)
IT 74-98-6, Propane, uses 75-19-4, Cyclopropane 75-28-5, Isobutane
106-97-8, Butane, uses 115-07-1, Propylene, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(hydrofluorocarbon refrigerant compns.)

L15 ANSWER 125 OF 175 CAPLUS
AN 1995:638189 CAPLUS
Correction of: 1993:174663
DN 123:16329
Correction of: 118:174663
OREF 123:3075a,3078a
ED Entered STN: 24 Jun 1995
TI Gas chromatographic identification of ecologically safe halocarbon cooling agents
AU Zenkevich, I. G.; Konyukhova, S. V.
CS Russia
SO Vestnik Sankt-Peterburgskogo Universiteta, Seriya 4: Fizika, Khimiya (1992), (1), 66-70
CODEN: VSUKEH
PB Izdatel'stvo Sankt-Peterburgskogo Universiteta
DT Journal
LA Russian
CC 59-1 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 80
AB Simple F-containing organic compds., including O3-destroying and ecol.-safe fluorocarbon cooling agents, can be determined in air in the presence of other hydrocarbons by gas chromatog. (GC) using the GC retention index of the compds. on nonpolar sorbent Porapak Q and polar sorbent Silipore 600 in conjunction with a previously compiled and expanded database.
ST cooling agent detn air; halocarbon detn air gas chromatog; fluorocarbon detn air gas chromatog; ecol safe refrigerant detn air
IT Air analysis
Air pollution
(gas chromatog. identification of ecol. safe halocarbon cooling agents)
IT Hydrocarbons, analysis
RL: ARU (Analytical role, unclassified); ANST (Analytical study)

(gas chromatog. identification of ecol. safe halocarbon cooling agents)
IT Refrigeration
(agents, gas chromatog. identification of ecol. safe halocarbon cooling agents)
IT Hydrocarbons, analysis
RL: ANT (Analyte); ANST (Analytical study)
(halo, gas chromatog. identification of ecol. safe halocarbon cooling agents)
IT 56-23-5, Tetrachloromethane, analysis 67-66-3, Chloroform, analysis 71-55-6, 1,1,1-Trichloroethane 74-87-3, Methyl chloride, analysis 74-88-4, Methyl iodide, analysis 74-95-3, Dibromomethane 74-97-5, Bromochloromethane 75-00-3, Ethyl chloride 75-01-4, analysis 75-02-5, Fluoroethene 75-09-2, Dichloromethane, analysis 75-10-5 , Difluoromethane 75-25-2, Bromoform 75-26-3, Isopropyl bromide 75-27-4, Bromodichloromethane 75-29-6, Isopropyl chloride 75-34-3, 1,1-Dichloroethane 75-37-6, 1,1-Difluoroethane 75-38-7 75-43-4 75-45-6 75-46-7 75-69-4, Khladon 11 75-71-8, Khladon 12 75-72-9, Khladon 13 75-73-0 76-01-7, Pentachloroethane 76-12-0 76-13-1, Khladon 113 76-14-2 76-15-3 76-16-4 76-19-7 78-76-2, 2-Bromobutane 78-86-4, 2-Chlorobutane 78-87-5, 1,2-Dichloropropane 79-01-6, Trichloroethene, analysis 79-34-5, 1,1,2,2-Tetrachloroethane 106-93-4, 1,2-Dibromoethane 106-95-6, Allyl bromide, analysis 107-06-2, 1,2-Dichloroethane, analysis 107-84-6, Isopentyl chloride 109-65-9, Butyl bromide 109-70-6, 1-Bromo-3-chloro-propane 115-25-3, Octafluorocyclobutane 116-14-3, analysis 116-15-4, Hexafluoropropene 124-48-1, Dibromochloromethane 124-73-2, 1,2-Dibromo-1,1,2,2,-tetrafluoroethane 127-18-4, Tetrachloroethene, analysis 142-28-9, 1,3-Dichloropropane 306-94-5 307-45-9, Perfluorodecane 335-57-9, Perfluoroheptane 338-65-8 353-59-3, Bromochlorodifluoromethane 354-04-1 354-07-4 354-14-3 354-21-2 354-33-6 359-35-3 420-46-2 423-55-2 430-66-0 430-90-0 431-07-2 462-06-6, Fluorobenzene 471-43-2, 1,1-Dichloro-2,2-difluoroethane 507-19-7, tert-Butyl bromide 540-54-5, Propylchloride 593-60-2, Vinyl bromide 593-70-4 624-72-6 762-50-5 811-97-2 1511-62-2, Bromodifluoromethane 20705-29-7
RL: ANT (Analyte); ANST (Analytical study)
(gas chromatog. identification of ecol. safe halocarbon cooling agents)
IT 71-43-2, Benzene, analysis 74-85-1, Ethene, analysis 74-86-2, Acetylene, analysis 74-99-7, Propyne 75-19-4, Cyclopropane 75-28-5 78-78-4, Isopentane 100-41-4, analysis 106-98-9, 1-Butene, analysis 106-99-0, 1,3-Butadiene, analysis 108-87-2, Methylcyclohexane 108-88-3, Toluene, analysis 109-68-2, 2-Pentene 109-69-3, Butyl chloride 110-83-8, Cyclohexene, analysis 115-07-1, 1-Propene, analysis 115-11-7, 2-Methylpropene, analysis 287-92-3, Cyclopentane 463-49-0, 1,2-Propadiene 504-60-9, 1,3-Pentadiene 590-18-1, cis-2-Butene 592-41-6, 1-Hexene, analysis 592-42-7, 1,5-Hexadiene 592-76-7, 1-Heptene 624-64-6, trans-2-Butene
RL: ARU (Analytical role, unclassified); ANST (Analytical study)
(gas chromatog. identification of ecol. safe halocarbon cooling agents)

L15 ANSWER 126 OF 175 CAPLUS
AN 1995:426843 CAPLUS
DN 122:164680
OREF 122:30279a,30282a
ED Entered STN: 21 Mar 1995
TI Quasi-azeotropic mixtures utilizable as refrigerating fluids.
IN Basile, Giampiero; Musso, Ezio
PA Ausimot S.p.A., Italy
SO Eur. Pat. Appl., 10 pp.
CODEN: EPXXDW
DT Patent
LA English

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IC   ICM  C09K005-04
CC   48-5 (Unit Operations and Processes)
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
     ---------------     ----   --------   --------------------   --------
PI   EP 638623            A1    19950215   EP 1994-112256         19940805
     EP 638623            B1    19981209
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, NL, PT, SE
     AT 174374            T     19981215   AT 1994-112256         19940805
PRAI IT 1993-MI1829       A     19930813
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 EP 638623       ICM    C09K005-04
                 IPCI   C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
                 ECLA   C09K005/04B4; C09K005/04B4B
 AT 174374       IPCI   C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
AB   The mixts. utilizable as refrigerating fluids in substitution of
     R-12 or R-502 comprise (chloro)fluorohydrocarbons, optionally in admixt.
     with C3H8, cyclopropane, or di-Me ether.
ST   refrigerant quasi azeotropic mixt; propane refrigerant quasi azeotropic
     mixt; cyclopropane refrigerant quasi azeotropic mixt; ether refrigerant
     quasi azeotropic mixt
IT   Refrigeration
        (agents, quasi-azeotropic mixts. of (chloro)fluorohydrocarbons as)
IT   74-98-6, Propane, uses 75-10-5, R-32 (Refrigerant)   75-19-4,
     Cyclopropane   75-45-6, R-22   115-10-6, Dimethyl ether 354-33-6
     , R-125 420-46-2, R-143a 811-97-2, R-134a
     RL: TEM (Technical or engineered material use); USES (Uses)
        (refrigerant of quasi-azeotropic mixts. containing)

L15  ANSWER 127 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1995:374957  CAPLUS
DN   123:146083
OREF 123:26020h,26021a
ED   Entered STN:  25 Feb 1995
TI   Preparation of expanded synthetic polymers without use of
     chlorofluorohydrocarbons
IN   Sato, Hisashi; Takeyasu, Hiromitsu; Aoyanagi, Minako; Kamemura, Ichiro
PA   Asahi Glass Co Ltd, Japan
SO   Jpn. Kokai Tokkyo Koho, 10 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C08G018-48
     ICS  C08G018-08; C08J009-14
ICI  C08G018-48, C08G101-00; C08L075-04
CC   38-3 (Plastics Fabrication and Uses)
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
     ---------------     ----   --------   --------------------   --------
PI   JP 06306139          A     19941101   JP 1993-120635         19930423
     JP 3279389           B2    20020430
PRAI JP 1993-120635             19930423
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 JP 06306139     ICM    C08G018-48
                 ICS    C08G018-08; C08J009-14
                 ICI    C08G018-48, C08G101-00; C08L075-04
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IPCI C08G0018-48 [ICM,5]; C08G0018-08 [ICS,5]; C08J0009-14 [ICS,5]; C08J0009-00 [ICS,5,C*]; C08G0018-48 [ICI,5]; C08G0018-00 [ICI,5,C*]; C08G0101-00 [ICI,5]; C08L0075-04 [ICI,5]; C08L0075-00 [ICI,5,C*]
IPCR C08G0018-08 [I,A]; C08G0018-00 [I,C*]; C08G0018-00 [I,A]; C08G0018-48 [I,A]; C08G0018-50 [I,A]; C08G0101-00 [N,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]

AB Title polymers are prepared by treating polyisocyanates with active H compds. [containing polyether polyols (aromatic amine-alkylene oxide adducts)] containing ≥2 active H functional groups reactive with NCO by using (partially) F-substituted hydrocarbons as low-b.p. organic blowing agents. Thus, a compatible composition containing glycerin poly(propylene oxide) adduct [OH value (A) 420] 40, ethylene oxide-propylene oxide copolymer sucrose adduct (A 450) 40, toluenediamine poly(propylene oxide) adduct (A 440) 20, a silicone foam stabilizer 2, H2O 2, N,N-dimethylcyclohexylamine, F2HCMe, and MDI-CR was blown in a wooden box to obtain a polyurethane foam (core d. 30 ± 2 kg/m3) with good surface appearance, thermal conductivity, and dimensional stability.

ST polyurethane foam prepn; fluoroethane blowing agent cellular polyurethane; glycerin polyoxyalkylene ether polyurethane foam; propylene oxide copolymer polyurethane foam; ethylene oxide copolymer polyurethane foam; sucrose polyoxyalkylene ether polyurethane foam; toluenediamine polyoxyalkylene ether polyurethane foam; MDI copolymer polyurethane foam; chlorofluoro hydrocarbon free blowing agent; fluorohydrocarbon blowing agent polyoxyalkylene polyurethane; low boiling point blowing agent

IT Blowing agents
(low-boiling fluorohydrocarbons for preparation of good expanded synthetic polymers)

IT Urethane polymers, uses
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(preparation of cellular synthetic polymers without use of chlorofluorohydrocarbons)

IT Hydrocarbons, uses
RL: MOA (Modifier or additive use); USES (Uses)
(fluoro, low-boiling, blowing agents; preparation of good expanded synthetic polymers without use of chlorofluorohydrocarbons)

IT Urethane polymers, uses
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyoxyalkylene-, preparation of cellular synthetic polymers without use of chlorofluorohydrocarbons)

IT 75-10-5, Difluoromethane 75-37-6, 1,1-Difluoroethane 75-73-0, Perfluoromethane 76-16-4, Perfluoroethane 76-19-7, Perfluoropropane 335-57-9, Perfluoroheptane 354-33-6, Pentafluoroethane 355-25-9, Perfluorobutane 355-42-0, Perfluorohexane 355-68-0, Dodecafluorocyclohexane 376-77-2, Decafluorocyclopentane 381-95-3 382-09-2 392-56-3, Hexafluorobenzene 406-58-6, 1,1,1,3,3-Pentafluorobutane 407-59-0, 1,1,1,4,4,4-Hexafluorobutane 420-26-8, 2-Fluoropropane 420-45-1, 2,2-Difluoropropane 420-46-2, 1,1,1-Trifluoroethane 421-07-8, 1,1,1-Trifluoropropane 421-48-7, 1,1,1,2-Tetrafluoropropane 430-61-5, 1,1-Difluoropropane 431-31-2, 1,1,1,2,3-Pentafluoropropane 431-63-0, 1,1,1,2,3,3-Hexafluoropropane 431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane 460-13-9, 1-Fluoropropane 460-36-6, 1,1,1,3-Tetrafluoropropane 460-73-1, 1,1,1,3,3-Pentafluoropropane 462-39-5, 1,3-Difluoropropane 662-00-0, 1,1,1,2,2,3,3-Heptafluorobutane 662-35-1, 1,1,1,2,2,3,3,4-Octafluorobutane 677-56-5, 1,1,1,2,2,3-Hexafluoropropane 678-26-2, Perfluoropentane 679-86-7, 1,1,2,2,3-Pentafluoropropane 680-00-2,

1,1,2,2,3,3-Hexafluoropropane 680-17-1, 1,1,1,2,3,3,4,4,4-Nonafluorobutane 690-39-1 811-94-9, 1,2,2-Trifluoropropane 811-97-2, 1,1,1,2-Tetrafluoroethane 813-75-2, 1,2,2,3-Tetrafluoropropane 1814-88-6, 1,1,1,2,2-Pentafluoropropane 2252-84-8, 1,1,1,2,2,3,3-Heptafluoropropane 24270-66-4, 1,1,2,3,3-Pentafluoropropane 24270-67-5, 1,3,3-Trifluoropropane 24270-68-6, 1,1,2,3-Tetrafluoropropane 40723-63-5, 1,1,2,2-Tetrafluoropropane 62126-90-3, 1,2-Difluoropropane 65781-20-6 65781-23-9 66794-30-7, 1,1,3,3-Tetrafluoropropane 66794-35-2, 1,1,2-Trifluoropropane 66794-36-3, 1,2,3-Trifluoropropane 75995-72-1, 1,1,1,2,3,4,4,4-Octafluorobutane 76523-97-2 86884-16-4 119450-58-7 119450-66-7 161791-22-6 161791-27-1 161791-34-0 161791-36-2
RL: MOA (Modifier or additive use); USES (Uses)
(blowing agents; preparation of good expanded synthetic polymers without use of chlorofluorohydrocarbons)

IT 166939-79-3P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(preparation of cellular synthetic polymers without use of chlorofluorohydrocarbons)

L15 ANSWER 128 OF 175 CAPLUS
AN 1995:374956 CAPLUS
DN 123:145637
OREF 123:25953a,25956a
ED Entered STN: 25 Feb 1995
TI Preparation of polymer foams using fluoroalkanes as blowing agents
IN Sato, Hisashi; Takeyasu, Hiromitsu; Aoyanagi, Minako; Kamemura, Ichiro
PA Asahi Glass Co Ltd, Japan
SO Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C08G018-48
ICS C08G018-08; C08J009-14
ICI C08G018-48, C08G101-00; C08L075-04
CC 37-6 (Plastics Manufacture and Processing)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 06306138	A	19941101	JP 1993-120634	19930423
PRAI	JP 1993-120634		19930423		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 06306138	ICM	C08G018-48
	ICS	C08G018-08; C08J009-14
	ICI	C08G018-48, C08G101-00; C08L075-04
	IPCI	C08G0018-48 [ICM,5]; C08G0018-08 [ICS,5]; C08J0009-14 [ICS,5]; C08J0009-00 [ICS,5,C*]; C08G0018-48 [ICI,5]; C08G0018-00 [ICI,5,C*]; C08G0101-00 [ICI,5]; C08L0075-04 [ICI,5]; C08L0075-00 [ICI,5,C*]
	IPCR	C08G0018-08 [I,A]; C08G0018-00 [I,C*]; C08G0018-00 [I,A]; C08G0018-48 [I,A]; C08G0018-50 [I,A]; C08G0101-00 [N,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]

AB Cellular polymers are prepared by reacting polyisocyanates with active H-containing compds. in the presence of low-boiling fluoroalkanes as blowing agents. A mixture of propoxylated glycerol, an ethylene oxide-propylene oxide-sucrose adduct, propoxylated ethylenediamine, silicone, H2O, N,N-dimethylcyclohexylamine, and MeCF2H was mixed with PAPI to give a

polyurethane foam (d. 28-30 kg/m3) with good thermal conductivity, appearance, and dimensional stability.

ST polyurethane blowing fluoroalkane; alkane fluoro blowing polyurethane; fluoroethane blowing agent polyurethane; difluoroethane blowing agent polyurethane; ethane difluoro blowing polyurethane

IT Blowing agents
(fluoro alkanes; for manufacture of polyurethane foams)

IT Urethane polymers, preparation
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(fluoroalkanes as blowing agents for manufacture of cellular)

IT Alkanes, uses
RL: MOA (Modifier or additive use); USES (Uses)
(fluoro, blowing agents; for manufacture of polyurethane foams)

IT Urethane polymers, preparation
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyoxyalkylene-, fluoroalkanes as blowing agents for manufacture of cellular)

IT 75-10-5, Difluoromethane 75-37-6, 1,1-Difluoroethane 75-73-0, Perfluoromethane 76-16-4, Perfluoroethane 76-19-7, Perfluoropropane 335-57-9, Perfluoroheptane 354-33-6, Pentafluoroethane 355-25-9, Perfluorobutane 355-42-0, Perfluorohexane 355-68-0, Dodecafluorocyclohexane 376-77-2, Decafluorocyclopentane 381-95-3 382-09-2 392-56-3, Hexafluorobenzene 406-58-6, 1,1,1,3,3-Pentafluorobutane 407-59-0, 1,1,1,4,4,4-Hexafluorobutane 420-26-8, 2-Fluoropropane 420-45-1, 2,2-Difluoropropane 420-46-2, 1,1,1-Trifluoroethane 421-07-8, 1,1,1-Trifluoropropane 421-48-7, 1,1,1,2-Tetrafluoropropane 430-61-5, 1,1-Difluoropropane 431-31-2, 1,1,1,2,3-Pentafluoropropane 431-63-0, 1,1,1,2,3,3-Hexafluoropropane 431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane 460-13-9, 1-Fluoropropane 460-36-6, 1,1,1,3-Tetrafluoropropane 460-73-1, 1,1,1,3,3-Pentafluoropropane 462-39-5, 1,3-Difluoropropane 662-00-0, 1,1,1,2,2,3,3-Heptafluorobutane 662-35-1, 1,1,1,2,2,3,3,4-Octafluorobutane 677-56-5, 1,1,1,2,2,3-Hexafluoropropane 678-26-2, Perfluoropentane 679-86-7, 1,1,2,2,3-Pentafluoropropane 680-00-2, 1,1,2,2,3,3-Hexafluoropropane 680-17-1, 1,1,1,2,3,3,4,4,4-Nonafluorobutane 690-39-1 811-94-9, 1,2,2-Trifluoropropane 811-97-2, 1,1,1,2-Tetrafluoroethane 813-75-2, 1,2,2,3-Tetrafluoropropane 1814-88-6, 1,1,1,2,2-Pentafluoropropane 2252-84-8, 1,1,1,2,2,3,3-Heptafluoropropane 24270-66-4, 1,1,2,3,3-Pentafluoropropane 24270-67-5, 1,3,3-Trifluoropropane 24270-68-6, 1,1,2,3-Tetrafluoropropane 40723-63-5, 1,1,2,2-Tetrafluoropropane 62126-90-3, 1,2-Difluoropropane 65781-20-6 65781-23-9 66794-30-7, 1,1,3,3-Tetrafluoropropane 66794-35-2, 1,1,2-Trifluoropropane 66794-36-3, 1,2,3-Trifluoropropane 75995-72-1, 1,1,1,2,3,4,4,4-Octafluorobutane 76523-97-2 86884-16-4 119450-58-7 119450-66-7 161791-22-6 161791-27-1 161791-34-0 161791-36-2
RL: MOA (Modifier or additive use); USES (Uses)
(blowing agents; for manufacture of polyurethane foams)

IT 166939-78-2P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(fluoroalkanes as blowing agents for manufacture of cellular)

L15 ANSWER 129 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN

AN 1995:370770 CAPLUS

DN 122:316473

OREF 122:57541a,57544a

ED Entered STN: 23 Feb 1995

TI Nonpolluting manufacture of synthetic resin foams

IN Sato, Hisashi; Takeyasu, Hiromitsu; Aoyanagi, Minako; Kamemura, Ichiro

PA   Asahi Glass Co Ltd, Japan
SO   Jpn. Kokai Tokkyo Koho, 11 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM C08G018-48
     ICS C08G018-08; C08J009-14
ICI C08G018-48, C08G101-00; C08L075-04
CC   38-3 (Plastics Fabrication and Uses)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 06306136	A	19941101	JP 1993-120628	19930423
PRAI	JP 1993-120628		19930423		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 06306136	ICM	C08G018-48
	ICS	C08G018-08; C08J009-14
	ICI	C08G018-48, C08G101-00; C08L075-04
	IPCI	C08G0018-48 [ICM,5]; C08G0018-08 [ICS,5]; C08J0009-14 [ICS,5]; C08J0009-00 [ICS,5,C*]; C08G0018-48 [ICI,5]; C08G0018-00 [ICI,5,C*]; C08G0101-00 [ICI,5]; C08L0075-04 [ICI,5]; C08L0075-00 [ICI,5,C*]
	IPCR	C08G0018-08 [I,A]; C08G0018-00 [I,C*]; C08G0018-00 [I,A]; C08G0018-48 [I,A]; C08G0101-00 [N,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]

AB   In manufacture of the foams by reaction of polyisocyanates and NCO-reactive compds. containing ≥2 active H in the presence of low-b.p. organic blowing agents, F-substituted hydrocarbons are used as the blowing agents and polyether polyols composed of alkylene oxide adducts of polysaccharides and/or monosaccharides are used as at least part of the active H-containing compds. Thus, a composition containing glycerin-initiated polypropylene glycol, toluenediamine-initiated propylene oxide-ethylene oxide copolymer, silicone stabilizer, H_2O, N,N-dimethylcyclohexylamine, CF_2HMe, and polymethylenepolyphenyl isocyanate was expanded in a box to give a foam showing core d. 29.3 kg/m3 and compressive strength 1.70 kg/cm2.
ST   polyoxyalkylene polyurethane fluorocarbon blowing agent
IT   Blowing agents
        (fluoro hydrocarbons; nonpolluting blowing agents for manufacture of polyoxyalkylene-polyurethane foams)
IT   Hydrocarbons, uses
     RL: MOA (Modifier or additive use); USES (Uses)
        (fluoro, blowing agents; nonpolluting blowing agents for manufacture of polyoxyalkylene-polyurethane foams)
IT   Urethane polymers, processes
     RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
        (polyoxyalkylene-, cellular; nonpolluting blowing agents for manufacture of polyoxyalkylene-polyurethane foams)
IT   75-10-5, Difluoromethane   75-37-6, 1,1-Difluoroethane   75-73-0, Carbontetrafluoride   76-16-4, Hexafluoroethane   76-19-7, Octafluoropropane   335-57-9, Hexadecafluoroheptane 354-33-6, 1,1,1,2,2-Pentafluoroethane   355-25-9, Decafluorobutane   355-42-0, Tetradecafluorohexane   381-95-3   382-09-2   392-56-3   406-58-6, 1,1,1,3,3-Pentafluorobutane   407-59-0, 1,1,1,4,4,4-Hexafluorobutane 420-26-8, 2-Fluoropropane   420-45-1, 2,2-Difluoropropane 420-46-2 , 1,1,1-Trifluoroethane   421-07-8, 1,1,1-Trifluoropropane   421-48-7, 1,1,1,2-Tetrafluoropropane   430-61-5, 1,1-Difluoropropane   431-31-2, 1,1,1,2,3,-Pentafluoropropane   431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane 460-13-9, 1-Fluoropropane   460-36-6, 1,1,1,3-Tetrafluoropropane

460-73-1, 1,1,1,3,3,-Pentafluoropropane   462-39-5, 1,3-Difluoropropane
662-00-0, 1,1,1,2,2,3,3-Heptafluorobutane   662-35-1, 1,1,1,2,2,3,3,4-Octafluorobutane   677-56-5, 1,1,1,2,2,3-Hexafluoropropane   678-26-2, Dodecafluoropentane   679-86-7, 1,1,2,2,3,-Pentafluoropropane   680-00-2, 1,1,2,2,3,3-Hexafluoropropane   690-39-1, 1,1,1,3,3,3-Hexafluoropropane
811-94-9, 1,2,2-Trifluoropropane 811-97-2, 1,1,1,2-Tetrafluoroethane   1814-88-6, 1,1,1,2,2-Pentafluoropropane   2252-84-8, 1,1,1,2,2,3,3-Heptafluoropropane   2924-29-0, 1,1,1,2,2,4,4,4-Octafluorobutane   12693-22-0   24270-66-4, 1,1,2,3,3-Pentafluoropropane
24270-67-5, 1,1,3-Trifluoropropane   24270-68-6, 1,1,2,3-Tetrafluoropropane   40723-63-5, 1,1,2,2-Tetrafluoropropane   62126-90-3, 1,2-Difluoropropane   65781-20-6   65781-23-9   66794-30-7, 1,1,3,3-Tetrafluoropropane   66794-35-2, 1,1,2-Trifluoropropane
66794-36-3, 1,2,3-Trifluoropropane   75995-72-1, 1,1,1,2,3,4,4,4-Octafluorobutane   76523-97-2   86498-67-1   86884-16-4   119450-58-7
119450-66-7   161791-22-6   161791-27-1   161791-34-0   161791-36-2
RL: MOA (Modifier or additive use); USES (Uses)
(blowing agents; nonpolluting blowing agents for manufacture of polyoxyalkylene-polyurethane foams)

IT   154361-01-0P   163518-62-5P
RL: IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(cellular; nonpolluting blowing agents for manufacture of polyoxyalkylene-polyurethane foams)

L15 ANSWER 130 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1995:370093 CAPLUS
DN   122:294213
OREF 122:53577a,53580a
ED   Entered STN: 23 Feb 1995
TI   Transport properties of pure and mixed alternative refrigerants
AU   Geller, V. Z.; Paulaitis, M. E.; Bivens, D. B.; Yokozeki, A.
CS   Center Molecular and Engineering Thermodynamics, University Delaware, Newark, DE, 19716, USA
SO   Science et Technique du Froid (1994), (2 CFCS, the Day After), 403-10
CODEN: STFRD4; ISSN: 0151-1637
DT   Journal
LA   English
CC   48-5 (Unit Operations and Processes)
AB   New exptl. thermal conductivities and viscosities for several mixed refrigerants as well as for pure R32 in the dense gas region have been measured. The data cover a range of temps. from -20 to +100° and a pressures from 0.1 to 5 MPa. Equations for calculating the transport properties over a range of conditions have been developed from this data base and are also presented. A corresponding-states method for correlating and predicting dilute and dense gas viscosities is also proposed.
ST   alternative refrigerant transport property
IT   Refrigeration
(agents, transport properties of pure and mixed alternative refrigerants)
IT   74-98-6, r290, properties 75-10-5, r32 Refrigerant   75-45-6, r22 354-33-6, r125 420-46-2, r143a 811-97-2, r134a
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(transport properties of pure and mixed alternative refrigerants)

L15 ANSWER 131 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1995:370090 CAPLUS
DN   122:294211
OREF 122:53577a,53580a

ED   Entered STN: 23 Feb 1995
TI   Thermophysical properties of blends as alternatives for the refrigerants
     R22 and R502
AU   Benade, W.; Guenther, D.; Steimle, F.
CS   Institut fur Angewandte Thermodynamik und Klimatechnik, Universitat Essen,
     Essen, D-45141, Germany
SO   Science et Technique du Froid (1994), (2 CFCS, the Day After), 375-84
     CODEN: STFRD4; ISSN: 0151-1637
DT   Journal
LA   English
CC   48-5 (Unit Operations and Processes)
AB   The d. and the sp. heat capacity of subcooled liqs. were measured in a
     certain range of temps. at constant pressure. Empirical functional
     relations in polynomial form between the temperature and the measured
quantities
     are established. The investigated liqs. are binary or ternary mixts. of
     the components R134a, R125, R32 and R143a. The coeffs. of the polynomial
     correlations are presented. These equations can be used for the calcn. of
     the enthalpy of the saturated liquid The predicted properties generally agree
     with the source data to about ±0.01% for the d. correlation and
     ±0.2% for the heat capacity correlation. The accuracy of the
     measurements is better than 0.1% for the d. and better than 1 % for the
     heat capacity, differences between 1% and a maximum of 3% occur only at
     temps. higher than 35°.
ST   alternative refrigerant R134a R125 R32 R143a; thermophys property
     alternative refrigerant
IT   Refrigeration
        (agents, thermophys. properties of blends as alternatives for the
        refrigerants R22 and R502)
IT   75-10-5, r32 Refrigerant 354-33-6, r125 420-46-2
     , r143a 811-97-2, r134a
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (binary or ternary mixts. containing; thermophys. properties of blends as
        alternatives for the refrigerants R22 and R502)

L15 ANSWER 132 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1995:370054 CAPLUS
DN   122:217428
OREF 122:39683a,39686a
ED   Entered STN: 23 Feb 1995
TI   Alternative refrigerants: Potential impact on system design
AU   Sibley, H. W.
CS   Carrier Corporation, Syracuse, NY, 13221, USA
SO   Science et Technique du Froid (1994), (2 CFCS, the Day After), 49-55
     CODEN: STFRD4; ISSN: 0151-1637
DT   Journal
LA   English
CC   48-5 (Unit Operations and Processes)
AB   The performance characteristics is presented of alternative refrigerants
     to chlorofluorocarbons and hydrochlorofluorocarbon refrigerants. An anal.
     of tech. and economic factors that affect their implementation into
     products are discussed.
ST   alternative refrigerant design impact
IT   Refrigeration
        (agents, impact of alternative refrigerants on system design)
IT   74-98-6, r 290, uses 75-10-5, r 32, Refrigerant   75-28-5, r
     600a   75-45-6, r 22   75-46-7, r 23, Halocarbon   75-68-3, r 142b
     76-19-7, r 218   106-97-8, r 600, uses   115-25-3, r-c 318   124-38-9, r
     744, uses   306-83-2, r 123   353-36-6, r 161 354-33-6, r 125
     359-35-3, r 134 420-46-2, r 143a   431-63-0, r 236Ea   431-89-0,
     r 227Ea   679-86-7, r 245Ca   690-39-1, r 236Fa 811-97-2, r 134a

1717-00-6, r 141b   2837-89-0, r 124   7664-41-7, r 717, uses
109207-22-9, e 134
RL: TEM (Technical or engineered material use); USES (Uses)
(impact of alternative refrigerants on system design)

L15 ANSWER 133 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1995:370052 CAPLUS
DN 122:269038
OREF 122:49041a,49044a
ED Entered STN: 23 Feb 1995
TI Composition shifts of zeotropic HFC refrigerants in service
AU Corr, S.; Murphy, F. T.
CS ICI Klea Business Research and Technology Group, Runcorn/Cheshire, WA7 4QD, UK
SO Science et Technique du Froid (1994), (2 CFCS, the Day After), 29-40
CODEN: STFRD4; ISSN: 0151-1637
DT Journal
LA English
CC 48-5 (Unit Operations and Processes)
AB A computer model was described that could simulate some aspects of the behavior of some blended fluorocarbon refrigerants as a number of refrigeration system parameters was varied. The major distinguishing features of the model are the inclusion of refrigerant-lubricating oil interactions and the composition shifts associated with vapor-liquid volume fraction effects in zeotropic refrigerants. The predicted behavior of zeotropic refrigerants in refrigeration systems under a number of scenarios was described.
ST zeotropic fluorocarbon refrigerant compn shift; refrigerator equil compn shift zeotropic fluorocarbon
IT Refrigeration
(modeling of composition shifts of zeotropic fluorocarbon refrigerants in presence of lubricating oil interactions)
IT Refrigeration
(agents, zeotropic; modeling of composition shifts of zeotropic fluorocarbon refrigerants in presence of lubricating oil interactions)
IT Equilibrium
(liquid-vapor, modeling of composition shifts of zeotropic fluorocarbon refrigerants in presence of lubricating oil interactions)
IT Lubricating oils
(synthetic, polyol esters; modeling of composition shifts of zeotropic fluorocarbon refrigerants in presence of lubricating oil interactions)
IT 75-10-5 354-33-6, R125 420-46-2, R143a
811-97-2, R134a
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(refrigerant; modeling of composition shifts of zeotropic fluorocarbon refrigerants in presence of lubricating oil interactions)

L15 ANSWER 134 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1995:370051 CAPLUS
DN 122:269037
OREF 122:49041a,49044a
ED Entered STN: 23 Feb 1995
TI Compatibility and performance of molecular sieve desiccants with alternative refrigerants
AU Cohen, A. P.
CS UOP Molecular Sieves, Tarrytown, NY, 10591, USA
SO Science et Technique du Froid (1994), (2 CFCS, the Day After), 21-8
CODEN: STFRD4; ISSN: 0151-1637
DT Journal
LA English
CC 48-5 (Unit Operations and Processes)

```
AB   This paper discusses the compatibility and performance testing of mol.
     sieve desiccants with alternative refrigerants and appropriate lubricants.
     The compatibility test method is described along with the results of tests
     with refrigerants 12, 22, 124, 125, 134a, 143a, and 152a.  The equilibrium
     water capacities of com. mol. sieve desiccants of interest to the
     stationary refrigeration industry in liquid refrigerants 12, 22,
     134a, 401c, and 32 are also presented as isotherms at 52°.  Drying
     rate was tested in a domestic refrigerator using R-134a and
     ester lubricant.  The test data show that the fluids can be dried and the
     rate can be explained in terms of the test conditions.
ST   mol sieve desiccant compatibility alternative refrigerant
IT   Zeolites, uses
     RL: NUU (Other use, unclassified); USES (Uses)
        (4A-XH-5, compatibility and performance of mol. sieve desiccants with
        alternative refrigerants)
IT   Zeolites, uses
     RL: NUU (Other use, unclassified); USES (Uses)
        (4A-XH-6, compatibility and performance of mol. sieve desiccants with
        alternative refrigerants)
IT   Zeolites, uses
     RL: NUU (Other use, unclassified); USES (Uses)
        (XH-7, compatibility and performance of mol. sieve desiccants with
        alternative refrigerants)
IT   Zeolites, uses
     RL: NUU (Other use, unclassified); USES (Uses)
        (XH-9, compatibility and performance of mol. sieve desiccants with
        alternative refrigerants)
IT   Refrigeration
        (agents, compatibility and performance of mol. sieve desiccants with
        alternative refrigerants)
IT   74-98-6, r290, uses 75-10-5, r32 Refrigerant   75-37-6, r152a
     75-45-6, r22   75-71-8, r12 354-33-6, r125 420-46-2,
     r143a 811-97-2, r134a   2837-89-0, r124
     RL: TEM (Technical or engineered material use); USES (Uses)
        (compatibility and performance of mol. sieve desiccants with
        alternative refrigerants)

L15  ANSWER 135 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1995:360911  CAPLUS
DN   122:218331
OREF 122:39819a,39822a
ED   Entered STN:  17 Feb 1995
TI   Hydraulic fluid compositions for refrigerators
IN   Sawada, Hiroki; Nakane, Shoji; Azuma, Riichi
PA   Kao Corp, Japan
SO   Jpn. Kokai Tokkyo Koho, 7 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C10M111-04
     ICS  C09K005-04
ICI  C10M111-04, C10M105-52, C10M107-50; C10N020-02, C10N030-08, C10N040-30
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
     Section cross-reference(s): 37
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
     ---------------     ----   --------   --------------------   --------
PI   JP 06336591          A     19941206   JP 1993-151148         19930527
PRAI JP 1993-151148             19930527
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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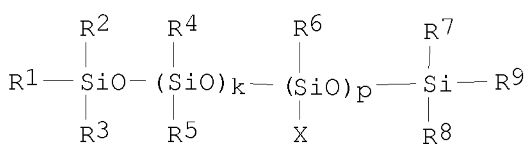
JP 06336591 ICM C10M111-04
ICS C09K005-04
ICI C10M111-04, C10M105-52, C10M107-50; C10N020-02, C10N030-08, C10N040-30
IPCI C10M0111-04 [ICM,5]; C09K0005-04 [ICS,5]; C09K0005-00 [ICS,5,C*]; C10M0111-04 [ICI,5]; C10M0111-00 [ICI,5,C*]; C10M0105-52 [ICI,5]; C10M0105-00 [ICI,5,C*]; C10M0107-50 [ICI,5]; C10M0107-00 [ICI,5,C*]; C10N0020-02 [ICI,5]; C10N0030-08 [ICI,5]; C10N0040-30 [ICI,5]
IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0111-00 [I,C*]; C10M0111-04 [I,A]; C10N0020-02 [N,A]; C10N0030-08 [N,A]; C10N0040-30 [N,A]

GI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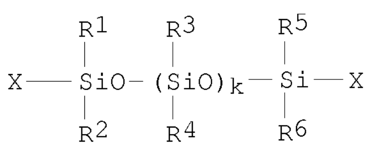
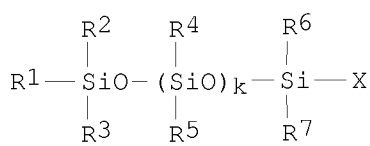

II


III

AB The title compns. comprise base oils of ≥1 polyoxyalkylene-modified silicones I, II, and III (R1-9 = alkyl, aryl; X = R10ArmO(AO)nR11; R10 = C2-3 alkylene; Ar = arylene; AO = C2-4 oxyalkylene; R11 = alkyl, aryl, arylalkyl; all R11s do not become H at once in I and II; m = 0, 1; p ≥1; k, p, and n are defined so that viscosity of the compds. at 40° becomes 1-1000 cSt.) and hydrofluorocarbons. The compns. are especially useful as hydraulic fluids for refrigerators, air conditioners, etc.
ST polyoxyalkylene modified silicone hydraulic fluid; refrigerating hydraulic fluid silicone; hydrofluorocarbon refrigerant base oil
IT Refrigerating apparatus
(hydraulic fluids for; polyoxyalkylene-modified silicone-hydrofluorocarbpons for refrigerator hydraulic fluids)
IT Hydraulic fluids
(refrigerant; polyoxyalkylene-modified silicone-hydrofluorocarbpons for refrigerator hydraulic fluids)
IT Siloxanes and Silicones, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(di-Me, polyoxyalkylene-modified; polyoxyalkylene-modified silicone-hydrofluorocarbpons for refrigerator hydraulic fluids)
IT 75-37-6, HFC152a 354-33-6, HFC125 359-35-3, HFC134 420-46-2, HFC143a
RL: TEM (Technical or engineered material use); USES (Uses)
(coolant; polyoxyalkylene-modified silicone-hydrofluorocarbpons for refrigerator hydraulic fluids)
IT 75-10-5, Difluoromethane 811-97-2, HFC134a 42557-10-8D, polyoxyalkylene-modified
RL: TEM (Technical or engineered material use); USES (Uses)
(polyoxyalkylene-modified silicone-hydrofluorocarbpons for refrigerator hydraulic fluids)

L15 ANSWER 136 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1995:257522 CAPLUS
DN 122:59212
OREF 122:11371a,11374a
ED Entered STN: 21 Dec 1994
TI Surface tension of refrigerants
AU Heide, R.
CS Inst. Luft- Kaeltetechnik Dresden, Germany
SO DKV-Tagungsbericht (1993), 20th(Vol. 2, Pt. 1), 137-50
CODEN: DKVTDW; ISSN: 0172-8849
PB Deutscher Kaelte- und Klimatechnischer Verein
DT Journal
LA German
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 65
AB Surface tension of alternative refrigerants (i.e., R134a, R125, R227, R152a, R143a, and R32) were made over a wide temperature range in order to better calculate heat transfer processes in refrigeration units.
The surface tension decreased almost linearly with increasing temperature (up to
nearly the critical temperature) and only in the vicinity of the critical temperature was
there a significant deviation from linearity.
ST surface tension alternative refrigerant
IT Surface tension
(measurement and temperature dependence of surface tension of alternative refrigerants)
IT Refrigeration
(agents, measurement and temperature dependence of surface tension of alternative refrigerants)
IT 75-10-5, R32 (Refrigerant) 75-37-6, R152a 354-33-6,
R125 420-46-2, R143a 431-89-0, R227 811-97-2, R134a
RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)
(measurement and temperature dependence of surface tension of alternative refrigerants)

L15 ANSWER 137 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1994:708824 CAPLUS
DN 121:308824
OREF 121:56369a,56372a
ED Entered STN: 24 Dec 1994
TI Reference data for the thermophysical properties of cryogenic fluids
AU Haynes, W.M.; Friend, D.G.
CS Thermophysics Division, National Institute of Standards and Technology, Boulder, CO, USA
SO Advances in Cryogenic Engineering (1994), 39(Pt. B), 1865-74
CODEN: ACYEAC; ISSN: 0065-2482
PB Plenum
DT Journal
LA English
CC 65-6 (General Physical Chemistry)
Section cross-reference(s): 48, 69
AB The Thermophysics Division of the National Institute of Stds. and Technol. (NIST) has long been involved in providing standard reference data for the thermophys. properties of cryogenic fluids. Comprehensive exptl. facilities have been used to provide accurate data for PVT relations, heat capacities, sound speeds, phase equilibrium, and transport properties for a large variety of well characterized cryogenic fluid systems. A concurrent effort, in the areas of critical data evaluation, modeling, and theory, has allowed the Division to provide correlating equations, tabular material, and computer programs which have become an integral part of the nation's

Standard Reference Data program. This critically evaluated information on the thermophys. properties of fluids and fluid mixts. of cryogenic interest is used for custody transfer applications and for efficient design and operation of cryogenic processes in the chemical, natural gas, aerospace, environmental, refrigeration, and other energy related industries. Available computer programs can calculate properties of pure fluids as well as provide predictions for fluid mixts.

ST   ref data thermophys property cryogenic fluid; equation state cryogenic fluid ref data; heat capacity cryogenic fluid ref data; phase equil cryogenic fluid ref data; thermal cond cryogenic fluid ref data; viscosity cryogenic fluid ref data; computer program thermophys property cryogenic fluid; database thermophys property cryogenic fluid; refrigerant thermophys property ref data

IT   Computer program
   (for thermophys. properties of cryogenic fluids by NIST)

IT   Cryogenic materials
   (reference data by NIST for thermophys. properties of)

IT   Equation of state
   (reference data for equation of state of cryogenic fluids by NIST)

IT   Heat capacity
   (reference data for heat capacity of cryogenic fluids by NIST)

IT   Sound and Ultrasound
   (reference data for sound velocity in cryogenic fluids by NIST)

IT   Thermal conductivity and conduction
   (reference data for thermal conductivity of cryogenic fluids by NIST)

IT   Thermal property
   (reference data for thermophys. properties of cryogenic fluids by NIST)

IT   Viscosity
   (reference data for viscosity of cryogenic fluids by NIST)

IT   Refrigeration
   (agents, reference data by NIST for thermophys. properties of)

IT   Equilibrium
   (liquid-vapor, reference data for liquid-vapor equilibrium of cryogenic fluids by NIST)

IT   Information science and technology
   (system, computerized, for thermophys. properties of cryogenic fluids by NIST)

IT   74-82-8, Methane, properties   74-84-0, Ethane, properties   74-85-1, Ethylene, properties   74-98-6, Propane, properties   75-28-5, Isobutane   106-97-8, Butane, properties   124-38-9, Carbon dioxide, properties   630-08-0, Carbon monoxide, properties   1333-74-0, Hydrogen, properties   7440-37-1, Argon, properties   7440-59-7, Helium, properties   7440-63-3, Xenon, properties   7727-37-9, Nitrogen, properties   7732-18-5, Water, properties   7782-39-0, Deuterium, properties   7782-44-7, Oxygen, properties   7783-54-2, Nitrogen trifluoride
RL: PRP (Properties)
   (reference data by NIST for thermophys. properties of)

IT   75-10-5, R 32 (Refrigerant)   75-19-4, Rc 270   75-37-6, r 152a   75-43-4, R 21 (Refrigerant)   75-45-6   75-46-7, R 23 (Halocarbon)   75-63-8, r 13b1   75-68-3, r 142b   75-69-4, R11   75-71-8, R12   75-72-9, R 13 (Refrigerant)   75-73-0, R 14 (Refrigerant)   76-13-1, r 113 (Halocarbon)   76-14-2, r 114 (Halocarbon)   76-15-3, r 115   76-19-7, r 218   78-78-4, Isopentane   107-83-5, Isohexane   109-66-0, Pentane, properties   110-54-3, Hexane, properties   115-25-3, Rc 318   306-83-2, r 123   354-23-4, r 123a 354-33-6, r 125   359-35-3, r 134   420-46-2, r 143a   430-66-0, r 143   431-63-0, r 236Ea   431-89-0, r 227Ea 811-97-2, r 134a   1717-00-6, r 141b   1814-88-6, r 245Cb   2837-89-0, r 124   7664-41-7, Ammonia, properties   7783-06-4, Hydrogen sulfide, properties   109207-22-9, e 134
RL: PRP (Properties)
   (reference data by NIST for thermophys. properties of pure and mixts. of)

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L15  ANSWER 138 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1994:704037  CAPLUS
DN   121:304037
OREF 121:55595a,55598a
ED   Entered STN:  24 Dec 1994
TI   Fluoroiodocarbon blends as CFC and Halon replacements
IN   Nimitz, Jonathan S.; Lankford, Lance H.
PA   USA
SO   PCT Int. Appl., 68 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM  C09K005-04
     ICS  C09K003-30; A62D001-00; C08J009-14
CC   48-5 (Unit Operations and Processes)
     Section cross-reference(s): 38, 50, 59
FAN.CNT 1
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             RU, SD, SE, SK, UA, UZ, VN
         RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE,
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     CA 2157567           C     20041130
     AU 9463587           A     19940926   AU 1994-63587          19940303
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     CN 1052031           C     20000503
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     RU 2140955           C1    19991110   RU 1995-121752         19940303
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     US 5444102           A     19950822   US 1994-269324         19940630
     US 5605647           A     19970225   US 1994-268583         19940630
     US 5685915           A     19971111   US 1994-268587         19940630
     US 7083742           B1    20060801   US 1994-269323         19940630
     US 5674451           A     19971007   US 1995-401384         19950217
     US 5562861           A     19961008   US 1995-414566         19950331
     US 5716549           A     19980210   US 1996-701669         19960822
     US 5695688           A     19971209   US 1996-707960         19960910
PRAI US 1993-27227        A     19930305
     WO 1994-US2321       W     19940303
     US 1995-414566       A3    19950331
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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         IPCR   A62D0001-00 [I,C*]; A62D0001-00 [I,A]; C07C0019-00
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[I,C*]; C07C0019-16 [I,A]; C07C0043-00 [I,C*]; C07C0043-12 [I,A]; C07C0211-00 [I,C*]; C07C0211-15 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-00 [I,C*]; C09K0003-00 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-22 [I,C*]; C11D0007-30 [I,A]; C11D0007-32 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]

	NCL	422/034.000; 252/372.000; 422/028.000; 422/037.000; 422/900.000
	ECLA	A62D001/00C6; C08J009/14P; C09K003/30; C09K005/04B4; C09K005/04B4B
US 5562861	IPCI	C09K0003-30 [ICM,6]; C23G0005-028 [ICS,6]; C23G0005-00 [ICS,6,C*]; A62D0001-08 [ICS,6]; A62D0001-00 [ICS,6,C*]
	IPCR	A62D0001-00 [I,C*]; A62D0001-00 [I,A]; C07C0019-00 [I,C*]; C07C0019-16 [I,A]; C07C0043-00 [I,C*]; C07C0043-12 [I,A]; C07C0211-00 [I,C*]; C07C0211-15 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-00 [I,C*]; C09K0003-00 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-22 [I,C*]; C11D0007-30 [I,A]; C11D0007-32 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]
	NCL	516/008.000; 252/002.000; 252/003.000; 252/008.000; 252/067.000; 252/364.000; 252/372.000; 516/010.000; 521/909.000; 521/910.000
	ECLA	A62D001/00C6; C08J009/14P; C09K003/30; C09K005/04B4; C09K005/04B4B
US 5716549	IPCI	C23G0005-028 [ICM,6]; C23G0005-00 [ICM,6,C*]; A62D0001-00 [ICS,6]; C09K0005-00 [ICS,6]; C09K0003-30 [ICS,6]
	IPCR	A62D0001-00 [I,C*]; A62D0001-00 [I,A]; C07C0019-00 [I,C*]; C07C0019-16 [I,A]; C07C0043-00 [I,C*]; C07C0043-12 [I,A]; C07C0211-00 [I,C*]; C07C0211-15 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-00 [I,C*]; C09K0003-00 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C11D0007-22 [I,C*]; C11D0007-30 [I,A]; C11D0007-32 [I,A]; C11D0007-50 [I,C*]; C11D0007-50 [I,A]
	NCL	252/364.000; 252/002.000; 252/008.000; 252/067.000; 252/069.000; 252/372.000
	ECLA	A62D001/00C6; C08J009/14P; C09K003/30; C09K005/04B4B; C09K005/04B4
US 5695688	IPCI	C09K0003-30 [ICM,6]; A62D0001-08 [ICS,6]; A62D0001-00 [ICS,6,C*]
	IPCR	A62D0001-00 [I,C*]; A62D0001-00 [I,A]; A62D0001-08 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	NCL	516/008.000; 252/008.000; 252/067.000; 252/372.000; 516/010.000
	ECLA	A62D001/00C6; C08J009/14P; C09K003/30; C09K005/04B4B; C09K005/04B4

AB The fluoroiodocarbons are effective, environmentally safe, nonflammable, low-toxicity refrigerants, solvents, foam blowing agents, propellants, and fire fighting agents. The agents are clean, elec. nonconductive, and have short atmospheric lifetimes, zero ozone-depletion potential, and low global warming potentials. The agents comprise ≥1 fluoroiodocarbon satisfying the general formula: $C_aH_bBr_cCl_dF_eI_fN_gO_h$, where a is 1-8; b is 0-2; c, d, g and h are each 0-1; e is 1-18; and f is 1-2, either neat or mixed with additives selected from

the group consisting of alcs., esters, ethers, fluoroethers, hydrocarbons, hydrofluorocarbons, and perfluorocarbons.

ST fluoroiodocarbon blend CFC Halon replacement; refrigerant fluoroiodocarbon; fire extinguisher fluoroiodocarbon; solvent fluoroiodocarbon; foam blowing agent fluoroiodocarbon; propellant fluoroiodocarbon

IT Propellants
Solvents
(fluoroiodocarbon blends as CFC and Halon replacements)

IT Alcohols, uses
Esters, uses
Ethers, uses
Hydrocarbons, uses
Ketones, uses
Ligroine
Naphtha
Perfluorocarbons
Petroleum spirits
Stoddard solvent
Turpentine
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoroiodocarbon blends as CFC and Halon replacements)

IT Blowing agents
(foam; fluoroiodocarbon blends as CFC and Halon replacements)

IT Refrigeration
(agents, fluoroiodocarbon blends as CFC and Halon replacements)

IT Fire
(extinguishers, fluoroiodocarbon blends as CFC and Halon replacements)

IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoro, iodo; fluoroiodocarbon blends as CFC and Halon replacements)

IT Ethers, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoroalkyl, fluoroiodocarbon blends as CFC and Halon replacements)

IT 60-29-7, uses 64-17-5, Ethanol, uses 67-56-1, Methanol, uses 67-63-0, 2-Propanol, uses 67-64-1, Acetone, uses 71-23-8, 1-Propanol, uses 71-36-3, 1-Butanol, uses 71-41-0, 1-Pentanol, uses 74-98-6, Propane, uses 75-10-5, Difluoromethane 75-19-4, Cyclopropane 75-21-8, Oxirane, uses 75-28-5, Isobutane 75-37-6 75-46-7, Trifluoromethane 75-56-9, uses 75-65-0, 2-Methyl-2-propanol, uses 75-73-0, Tetrafluoromethane 76-16-4, Hexafluoroethane 76-19-7, Octafluoropropane 78-78-4, 2-Methylbutane 78-83-1, 2-Methyl-1-propanol, uses 78-92-2, 2-Butanol 78-93-3, Butanone, uses 79-20-9, Methyl acetate 96-14-0, 3-Methylpentane 105-37-3, Ethyl propanoate 105-46-4, sec-Butyl acetate 105-54-4, Ethyl butanoate 106-97-8, Butane, uses 107-08-4 108-08-7, 2,4-Dimethylpentane 108-20-3, Diisopropyl ether 108-21-4, Isopropyl acetate 108-88-3, Toluene, uses 109-60-4, n-Propyl acetate 109-66-0, Pentane, uses 109-99-9, uses 110-19-0, Isobutyl acetate 110-54-3, Hexane, uses 111-43-3, Di-n-propyl ether 111-65-9, Octane, uses 111-84-2, Nonane 115-10-6, Dimethyl ether 115-25-3, Octafluorocyclobutane 123-86-4, n-Butyl acetate 123-91-1, 1,4-Dioxane, uses 124-18-5, Decane 138-86-3, Limonene 141-78-6, Acetic acid ethyl ester, uses 142-82-5, Heptane, uses 142-92-7, Hexyl acetate 142-96-1, Di-n-butyl ether 287-23-0, Cyclobutane 335-58-0 354-33-6, Pentafluoroethane 354-41-6, 1,1,2,2-Tetrafluoro-1-iodoethane 354-64-3, Pentafluoroiodoethane 354-65-4, 1,1,2,2-Tetrafluoro-1,2-diiodoethane 355-25-9, Decafluorobutane 355-42-0, Tetradecafluorohexane 355-43-1, 1-Iodotridecafluorohexane 373-53-5, Fluoroiodomethane 377-44-6 420-46-2, 1,1,1-Trifluoroethane 420-49-5, Chlorodifluoroiodomethane 421-14-7, Methyl trifluoromethyl ether 422-91-3, 1,1,2,2,3,3-Hexafluoro-1,3-diiodopropane 423-39-2,

Nonafluoro-1-iodobutane 425-82-1 431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane 463-82-1, 2,2-Dimethylpropane 507-63-1, 1-Iodoheptadecafluorooctane 542-69-8 554-12-1, Methyl propanoate 565-59-3, 2,3-Dimethylpentane 589-34-4, 3-Methyl hexane 623-42-7, Methyl butanoate 628-21-7 628-63-7, n-Pentyl acetate 628-77-3 629-09-4 638-79-9, 1-Iodoperfluoropentane 677-69-0, 1,1,1,2,3,3,3-Heptafluoro-2-iodopropane 678-26-2, Dodecafluoropentane 679-86-7, 1,1,2,2,3-Pentafluoropropane 753-66-2, Bromodifluoroiodomethane 754-34-7, Heptafluoro-1-iodopropane 811-97-2, 1,1,1,2-Tetrafluoroethane 931-91-9, Hexafluorocyclopropane 1120-21-4, Undecane 1184-76-5, Difluorodiiodomethane 1330-16-1, Pinene 1479-49-8 1493-03-4, Difluoroiodomethane 1561-52-0 1691-17-4, Bisdifluoromethyl ether 1885-48-9 2314-97-8, Trifluoroiodomethane 2356-61-8 3822-68-2, Pentafluorodimethyl ether 5764-87-4 6032-29-7, 2-Pentanol 20705-05-9, 1,1,2-Trifluoro-1-iodoethane 22485-44-5, Iodopentafluorocyclopropane 53772-78-4
RL: TEM (Technical or engineered material use); USES (Uses)
(fluoroiodocarbon blends as CFC and Halon replacements)

L15 ANSWER 139 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1994:682807 CAPLUS
DN 121:282807
OREF 121:51603a,51606a
ED Entered STN: 10 Dec 1994
TI ARTI Refrigerant Database
AU Cain, J. M.
CS Calm, James M., Great Falls, VA, USA
SO Report (1993), DOE/CE/23810-11D: Order No. DE93014774, 121 pp. Avail.: NTIS
From: Energy Res. Abstr. 1993, 18(8), Abstr. No. 24008
DT Report; General Review
LA English
CC 48-0 (Unit Operations and Processes)
AB A review with no refs. The refrigerant database consolidates and facilitates access to information to assist industry in developing equipment using alternative refrigerants. The underlying purpose is to accelerate phase out of chemical compds. of environmental concern. The database provides bibliog. citations and abstrs. for publications that may be useful in research and design of air-conditioning and refrigeration equipment. The complete documents are not included. The database identifies sources of specific information on R-32, R-123, R-124, R-125, R-134, R-134a, R-141b, R-142b, R-143a, R-152a, R-245ca, R-290 (propane), R717 (ammonia), ethers, and others as well as azeotropic and zeotropic blends of these fluids. It addresses lubricants including alkylbenzene, polyalkylene glycol, ester, and other synthetics as well as mineral oils. It also refs. documents addressing compatibility of refrigerants and lubricants with metals, plastics, elastomers, motor insulation, and other materials used in refrigerant circuits. Incomplete citations or abstrs. are provided for some documents to accelerate availability of the information and will be completed or replaced in future updates.
ST review refrigerant lubricant database
IT Lubricating oils
(database for)
IT Esters, uses
Hydrocarbon oils
Polyoxyalkylenes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(database for lubricants containing)
IT Ethers, uses
RL: TEM (Technical or engineered material use); USES (Uses)

(database for refrigerants containing)
IT   Refrigeration
        (agents, database for)
IT   Information science and technology
        (system, for refrigerants)
IT   71-43-2D, Benzene, alkyl derivative
     RL: TEM (Technical or engineered material use); USES (Uses)
        (database for lubricants containing)
IT   74-98-6, R-290, uses 75-10-5, R 32(Refrigerant)   75-37-6,
     R-152a   75-68-3, R-142b   306-83-2, R-123 354-33-6, R-125
     359-35-3, R-134 420-46-2, R-143a   679-86-7, R-245Ca
     811-97-2, R-134a   1717-00-6, R-141b   2837-89-0, R-124
     7664-41-7, Ammonia, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (database for refrigerants containing)

L15 ANSWER 140 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1994:633672 CAPLUS
DN   121:233672
OREF 121:42581a,42584a
ED   Entered STN: 12 Nov 1994
TI   Thermodynamic analysis of azeotropic and near-azeotropic CFCs alternatives
AU   Yin, Jianmin; He, Maogang; Liu, Xianding; Liu, Zhigang
CS   Dep. Power Mach. Eng., Xian Jiaotong Univ., Xian, Peop. Rep. China
SO   Gongcheng Rewuli Xuebao (1994), 15(2), 137-40
     CODEN: KCJPDF; ISSN: 0253-231X
DT   Journal
LA   Chinese
CC   48-5 (Unit Operations and Processes)
AB   Twelve pure refrigerants and fourteen azeotropic or near azeotropic
     possible CFC alternatives were analyzed. Some of these mixts. were
     approved to be able to replace CFC12 or HCFC22, such as R152a/R134a for
     CFC12 and R143a/R1270 for CFC22. In addition, the accuracy of the PR and CSD
     equations were also compared.
ST   refrigerant azeotropic mixt CFC alternative; thermodn analysis refrigerant
     azeotropic mixt
IT   Refrigeration
        (agents, mixts.; thermodn. anal. of azeotropic and near-azeotropic CFCs
        refrigerant alternatives)
IT   74-98-6, R290, properties 75-10-5, r 32, Refrigerant   75-28-5,
     R600a   75-37-6, R152a   75-45-6, R22   75-68-3, R142b   115-07-1, R1270,
     properties 354-33-6, R125   359-35-3, R134 420-46-2,
     R143a 811-97-2, R134a   2837-89-0, R124
     RL: PRP (Properties); TEM (Technical or engineered material use); USES
     (Uses)
        (thermodn. anal. of azeotropic and near-azeotropic CFCs refrigerant
        alternatives)

L15 ANSWER 141 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1994:558831 CAPLUS
DN   121:158831
OREF 121:28769a,28772a
ED   Entered STN: 01 Oct 1994
TI   Method of producing rigid polyurethane foams and products
     produced therefrom
IN   Blanpied, Robert H.; Butkus, Robert J.; McLaughlin, Andy I.; Donald,
     Richard L.
PA   Atlas Roofing Corp., USA
SO   U.S., 19 pp. Cont.-in-part of U.S. Ser. No. 720,735.
     CODEN: USXXAM
DT   Patent
LA   English

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IC   ICM  C08J009-14
INCL 521125000
CC   37-6 (Plastics Manufacture and Processing)
FAN.CNT 3
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   US 5294647           A     19940315    US 1993-18304          19930216
     US 5252625           A     19931012    US 1991-720735         19910625
     US 5254600           A     19931019    US 1992-851889         19920316
     US 5342859           A     19940830    US 1993-121428         19930916
PRAI US 1991-720735       A2    19910625
     US 1992-851889       A2    19920316
     US 1990-495616       B2    19900319
     US 1990-568707       B2    19900817
     US 1993-18304        A2    19930216
     US 1993-40032        B2    19930330
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
 --------------  -----  ----------------------------------------------
 US 5294647      ICM    C08J009-14
                 INCL   521125000
                 IPCI   C08J0009-14 [ICM,5]; C08J0009-00 [ICM,5,C*]
                 IPCR   C08G0018-00 [I,C*]; C08G0018-16 [I,A]; C08G0018-76
                        [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A];
                        C08J0009-30 [I,A]
                 NCL    521/125.000; 521/129.000; 521/130.000; 521/131.000;
                        521/170.000; 521/902.000
 US 5252625      IPCI   C08G0018-18 [ICM,5]; C08G0018-22 [ICS,5]; C08G0018-00
                        [ICS,5,C*]; C08J0009-08 [ICS,5]; C08J0009-00 [ICS,5,C*]
                 IPCR   C08G0018-00 [I,C*]; C08G0018-16 [I,A]; C08G0018-76
                        [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A];
                        C08J0009-30 [I,A]
                 NCL    521/125.000; 521/129.000; 521/131.000; 521/137.000;
                        521/155.000; 521/163.000; 521/172.000; 521/174.000
 US 5254600      IPCI   C08G0018-18 [ICM,5]; C08G0018-22 [ICS,5]; C08G0018-00
                        [ICS,5,C*]; C08J0009-08 [ICS,5]; C08J0009-00 [ICS,5,C*]
                 IPCR   C08G0018-00 [I,C*]; C08G0018-16 [I,A]; C08G0018-76
                        [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A];
                        C08J0009-30 [I,A]
                 NCL    521/125.000; 521/129.000; 521/131.000; 521/137.000;
                        521/155.000; 521/163.000; 521/172.000; 521/174.000
 US 5342859      IPCI   C08G0018-18 [ICM,5]; C08G0018-22 [ICS,5]; C08G0018-00
                        [ICS,5,C*]; C08J0009-08 [ICS,5]; C08J0009-00 [ICS,5,C*]
                 IPCR   C08G0018-00 [I,C*]; C08G0018-16 [I,A]; C08G0018-76
                        [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A];
                        C08J0009-30 [I,A]
                 NCL    521/125.000; 521/155.000; 521/159.000; 521/170.000;
                        521/174.000; 521/902.000
                 ECLA   C08G018/16B4; C08G018/76D2; C08J009/14H2+L75/04;
                        C08J009/30+L75/04; M08G; M08G; M08G; M08G
AB   Title thermosetting foams, useful for thermal insulators, are
     prepared by (a) preparing a 1st blend using a multi-functional isocyanate,
     e.g., polymeric polymethylene polyphenylisocyanate (I), (b) preparing a 2nd
     blend containing a polyol, water, a tertiary amine catalyst having ≥2 H
     bonding sites/mol., and an alkali metal organo-salt catalyst, (c) mixing a
     1st blowing agent with the 1st or 2nd blend, and (d) mixing the 1st and
     2nd blends.  Thus, a rigid foam was prepared by mixing a blend of
     Stepanpol 2502 100.00, Pluracol 975 15.00, surfactant 3.00, Dabco K-15
     7.50, Polycat-5 0.25, water 2.25, and HCFC-22 21.00 parts and a blend of I
     273.5, CFC-1124.00, and DC-5098 1.00 part.
ST   rigid polyurethane foam thermal insulator; tertiary amine
     catalyst polyurethane foam
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IT   Urethane polymers, preparation
     RL: PREP (Preparation)
        (cellular, rigid, preparation of, for thermal insulators)
IT   Blowing agents
        (chlorofluoro- or fluoro-alkanes, for rigid polyurethane foams
        , for thermal insulators)
IT   Thermal insulators
        (rigid polyurethane foams, preparation of)
IT   Alkanes, uses
     RL: USES (Uses)
        (chloro fluoro, blowing agents, for rigid polyurethane foams,
        for thermal insulators)
IT   Alkanes, uses
     RL: USES (Uses)
        (fluoro, blowing agents, for rigid polyurethane foams, for
        thermal insulators)
IT   Polyesters, preparation
     RL: PREP (Preparation)
        (hydroxy-terminated, polymer with polyisocyanates, cellular, rigid,
        preparation of, for thermal insulators)
IT   75-10-5, HFC-32   75-37-6   75-45-6, HCFC-22   75-68-3, HCFC-142b
     354-33-6, HFC-125 420-46-2, HFC-143a 811-97-2,
     HFC-134a   2837-89-0, HCFC-124
     RL: USES (Uses)
        (blowing agents, for rigid polyurethane foams, for thermal
        insulators)
IT   154680-08-7P   154942-40-2P   157263-02-0P   157565-84-9P   157565-85-0P
     RL: PREP (Preparation)
        (cellular, rigid, preparation of, for thermal insulators)
IT   90-72-2, 2,4,6-Tris(dimethylaminomethyl)phenol   3030-47-5,
     Pentamethyldiethylenetriamine   3033-62-3, Bis(2-dimethylaminoethyl) ether
     3164-85-0, Dabco K 15   15875-13-5
     RL: CAT (Catalyst use); USES (Uses)
        (polymerization catalysts, for rigid polyurethane foams, for thermal
        insulators)

L15  ANSWER 142 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1994:513115  CAPLUS
DN   121:113115
OREF 121:20357a,20360a
ED   Entered STN:  03 Sep 1994
TI   Refrigerator working fluid compositions
IN   Sawada, Hiroki; Kurosaki, Tomihiro
PA   Kao Corp, Japan
SO   Jpn. Kokai Tokkyo Koho, 8 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C10M105-20
     ICS  C09K005-04
ICI  C10N030-00, C10N030-08, C10N040-30
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   JP 06049471          A     19940222    JP 1992-224982         19920730
PRAI JP 1992-224982             19920730
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 JP 06049471     ICM    C10M105-20
                 ICS    C09K005-04
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                ICI    C10N030-00, C10N030-08, C10N040-30
                IPCI   C10M0105-20 [ICM,5]; C10M0105-00 [ICM,5,C*];
                       C09K0005-04 [ICS,5]; C09K0005-00 [ICS,5,C*];
                       C10N0030-00 [ICI,5]; C10N0030-08 [ICI,5]; C10N0040-30
                       [ICI,5]
                IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00
                       [I,C*]; C10M0105-20 [I,A]; C10N0030-00 [N,A];
                       C10N0030-08 [N,A]; C10N0040-30 [N,A]
AB   Refrigerator working fluid compns. comprise hydrofluorocarbons
     and base oils of ketone ether compds. having the general formula
     Q[OR5]y[O(R1O)m(CH2CHR2O)nCHR3C(:)O(CH2O)kR4]x, where Q = alc. residual
     group having 1-8 valences, R1 = C2-4 linear or branched alkylene group, R2
     = Me or Et, R3 and R5 = H or C≤20 linear or branched alkyl, aryl,
     or arylalkyl hydrocarbyl groups, m and n = 0-30, x = 1-8, yr = 0-7, x + y
     = 1-8, k = 0 or 1, and R4 = C≤20 linear or branched alkyl, aryl, or
     arylalkyl hydrocarbyl groups.  The hydrofluorocarbons are chosen from >1
     of R 32, R 152a, R 143a, R 134a, R 134 and R 125.
ST   Refrigerator working fluid compn; lubricating oil
     refrigerator working fluid; hydrofluorocarbon refrigerant
     lubricating oil refrigerator
IT   Lubricating oils
        (ketone ether compds., working fluids containing hydrofluorocarbon
        refrigerants and)
IT   Refrigerating apparatus
        (lubricating oils for, ketone ether compds. as, working fluids containing
        hydrofluorocarbon refrigerants and)
IT   134016-81-2P   155381-70-7P   155381-71-8P   155381-73-0P   155381-74-1P
     155381-75-2P   155411-78-2P   155420-64-7P   155420-68-1P
     RL: PREP (Preparation)
        (preparation of, lubricating oil, working fluids containing
hydrofluorocarbon
        refrigerants and)
IT   75-10-5, HFC 32   75-37-6, R 152a 354-33-6, R 125
     359-35-3, R 134 420-46-2, R 143a 811-97-2, R 134a
     RL: USES (Uses)
        (refrigerant, working fluids containing ketone ether compds. and, for
        refrigerators)

L15  ANSWER 143 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1994:438612  CAPLUS
DN   121:38612
OREF 121:7065a,7068a
ED   Entered STN:  23 Jul 1994
TI   working compositions for refrigerators
IN   Sawada, Hiroki; Togashi, Hiroyasu
PA   Kao Corp, Japan
SO   Jpn. Kokai Tokkyo Koho, 9 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM  C09K005-04
     ICS  C10M105-18; C10M105-38
ICI  C10N030-00, C10N040-30
CC   48-5 (Unit Operations and Processes)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
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PI   JP 06057243          A     19940301    JP 1992-236369         19920811
     JP 3003015           B2    20000124
PRAI JP 1992-236369             19920811
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 JP 06057243     ICM    C09K005-04
                 ICS    C10M105-18; C10M105-38
                 ICI    C10N030-00, C10N040-30
                 IPCI   C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*];
                        C10M0105-18 [ICS,5]; C10M0105-38 [ICS,5]; C10M0105-00
                        [ICS,5,C*]; C10N0030-00 [ICI,5]; C10N0040-30 [ICI,5]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00
                        [I,C*]; C10M0105-18 [I,A]; C10M0105-20 [I,A];
                        C10M0105-38 [I,A]; C10M0105-40 [I,A]; C10M0105-48
                        [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A];
                        C10N0030-00 [N,A]; C10N0040-30 [N,A]
AB   The title compns. contain compds. having ≥1 acetal groups and a
     (3-8)-valence residual alc. group as refrigerator oils, and
     hydrofluorocarbons.  The increase in acid value due to hydrolysis is
     minimized.
ST   refrigerator working compn
IT   Refrigeration
        (working compns., with high acid-value stability)
IT   75-10-5, Difluoromethane   75-37-6, 1,1-Difluoroethane
     354-33-6, Pentafluoroethane   359-35-3, 1,1,2,2-Tetrafluoroethane
     420-46-2, 1,1,1-Trifluoroethane 811-97-2,
     1,1,1,2-Tetrafluoroethane
     RL: USES (Uses)
        (working compns. containing, with high acid-value stability, for
        refrigerators)

L15  ANSWER 144 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1994:436854  CAPLUS
DN   121:36854
OREF 121:6811a,6814a
ED   Entered STN:  23 Jul 1994
TI   Blowing agents: the next generation
AU   Decaire, B. R.; Pham, H. T.; Richard, R. G.; Shankland, I. R.
CS   Allied-Signal Inc., Buffalo, NY, 14210, USA
SO   Proceedings of the SPI Annual Technical/Marketing Conference (1992),
     34th(Polyurethanes 92), 2-11
     CODEN: PSACEV; ISSN: 0740-8897
DT   Journal
LA   English
CC   37-6 (Plastics Manufacture and Processing)
AB   The paper addresses two general blowing agent options: the conventional
     liquid blowing agent, and the lower boiling, so-called gaseous blowing
     agent.  Liquid blowing agents like CFC-11 and HCFC-14b simplify foam
     processing techniques as well as blowing agent storage, handling and
     transportation.  There are several HFC gases which are also potential
     blowing agents, for instance HFC-134a, which is currently being introduced
     as a com. product as well as others like HFCs 32 and 125 which are
     currently under development.  Vapor phase thermal conductivity data are
presented
     which show that these species are also poorer insulators than HCFC-141b.
     Polyol solubility for the HFC gases can be significantly less than even HCFC-22
     when compared on a theor. equivalent (mole) substitution, i.e., a higher vapor
     pressure is required to maintain an equivalent solution of HFC gas in a polyol
     than is required for HCFC-22.
ST   blowing agent fluorohydrocarbon; polyol soly blowing agent
IT   Blowing agents
        (properties and polyol solubility of)
IT   Hydrocarbons, properties
     RL: PRP (Properties)
        (chloro fluoro, properties and polyol solubility of)
IT   Hydrocarbons, properties
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RL: PRP (Properties)
(fluoro, properties and polyol solubility of)

IT 71768-23-5, Terate 203 101551-03-5, Pluracol 975 137598-33-5, Terate 254
RL: USES (Uses)
(fluorohydrocarbon blowing agent solubility in)

IT 75-10-5, HFC 32 75-37-6, HFC 152a 75-45-6, HCFC 22 354-33-6, HFC 125 420-46-2, HFC 143a 811-97-2, HFC 134a 1717-00-6, HCFC 141b
RL: USES (Uses)
(properties and polyol solubility of)

L15 ANSWER 145 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1994:167672 CAPLUS
DN 120:167672
OREF 120:29542h,29543a
ED Entered STN: 02 Apr 1994
TI Thermodynamic evaluation of five alternative refrigerants in vapor-compression cycles
AU Kazachki, Georgi S.; Gage, Cynthia L.
CS Acurox Corp., Research Triangle Park, NC, USA
SO Actes Congr. Int. Froid, 18th (1991), Volume 2, 611-5 Publisher: 18th Int. Congr. Refrig., Saint-Hyacinthe, Que.
CODEN: 59HQA7
DT Conference
LA English
CC 48-7 (Unit Operations and Processes)
AB Thermodn. evaluation of R-32, R-125, R-134a, R-143a, and R152a in vapor compression cycles is given. The properties of the refrigerants as replacements for R-12, R-22 and R-502 are discussed.
ST alternative refrigerant thermodn; R32 thermodn property; R125 thermodn property; thermodn property R 134a; R 152a thermodn property
IT Refrigeration
(agents, alternative, thermodn. properties of)
IT 75-10-5, R-32 (Refrigerant) 75-37-6, R-152a 354-33-6, R-125 420-46-2, R-143a 811-97-2, R-134a
RL: USES (Uses)
(thermodn. evaluation of)

L15 ANSWER 146 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1994:167549 CAPLUS
DN 120:167549
OREF 120:29519a,29522a
ED Entered STN: 02 Apr 1994
TI Alternate refrigerants and lubricants for refrigeration compressors - status on CFC12 and R502 replacements
AU Sundaresan, S.G.
CS Copeland Corp., Sidney, OH, USA
SO Actes Congr. Int. Froid, 18th (1991), Volume 2, 881-7 Publisher: 18th Int. Congr. Refrig., Saint-Hyacinthe, Que.
CODEN: 59HQA7
DT Conference
LA English
CC 48-5 (Unit Operations and Processes)
AB For CFC 12 replacement, HFC 134a is not attractive for low evaporation temperature applications; blends containing HCFC 22, HFC 152a, and HCFC 124 are viable candidates to replace CFC 12 when used with alkylbenzene or blends containing alkylbenzene and mineral oil. Pentaerythritol ester and end-capped polyalkylene glycol are viable lubricants for use with HFC 134a. Due to higher hygroscopicity of esters and polyglycols, PET films used in motor insulation must be dried to recommended levels (<0.1 weight%) to avoid

embrittlement problems. For R 502 replacements, refrigerant blend MP81 is recommended in comparison to R 69S blend based on lower discharge temps. MP81 can be used with pentaerythritol esters. The candidate blend HFC 32/HFC 125 is not attractive due to higher pressures and higher discharge temps.

ST alternate refrigerant lubricant refrigeration compressor

IT Lubricating oils
(for refrigeration compressors using alternate refrigerants)

IT Polyoxyalkylenes, uses
RL: USES (Uses)
(lubricant, for refrigeration compressors using alternate refrigerants)

IT Refrigeration
(agents, CFC 12 and R 502 replacements, status of)

IT Lubricating oils
(base oils, lubricant mixture containing, for refrigeration compressors using alternate refrigerants)

IT Refrigerating apparatus
(compressors, alternate refrigerants and lubricants for)

IT 74-98-6, Propane, uses 75-10-5, Hfc 32 75-37-6, Hfc 152a 75-45-6, Hcfc 22 76-19-7 354-33-6, Hfc 125 420-46-2, Hfc 143a 811-97-2, Hfc 134a 2837-89-0, Hcfc 124
RL: USES (Uses)
(alternate refrigerant, performance of)

IT 75-71-8, Cfc 12 39432-81-0, r 502
RL: USES (Uses)
(alternate refrigerants to, status of)

IT 71-43-2D, Benzene, alkyl derivative 115-77-5D, Pentaerythritol, ester
RL: USES (Uses)
(lubricant, for refrigeration compressors using alternate refrigerants)

L15 ANSWER 147 OF 175 CAPLUS

AN 1994:138027 CAPLUS

DN 120:138027

OREF 120:24267a,24270a

ED Entered STN: 19 Mar 1994

TI Flammability of alternate refrigerants

AU Richard, Robert G.; Shankland, Ian R.

CS Buffalo, NY, USA

SO Actes Congr. Int. Froid, 18th (1991), Volume 2, 384-7 Publisher: 18th Int. Congr. Refrig., Saint-Hyacinthe, Que.
CODEN: 59HQA7

DT Conference

LA English

CC 48-5 (Unit Operations and Processes)

AB The flammability properties of alternate refrigerants (pure substances and mixts.) being considered are determined using the ASTM E 681 method. The effects of ignition source, size of the vessel, moisture content of gas mixture, temperature, and mixture composition are discussed.

ST flammability alternate refrigerant; HCFC refrigerant mixt flammability detn; HFC refrigerant flammability detn

IT Flammability
(determination of, for alternate refrigerants, by ASTM E 681 method)

IT Refrigeration
(agents, determination of flammability of pure or mixture, by ASTM E 681 method)

IT 74-82-8, Methane, properties 75-28-5, Isobutane 106-97-8, Butane, properties 107-31-3, Methyl formate
RL: PRP (Properties)
(flammability of, determination of, by ASTM E 681 method)

IT 75-45-6, HCFC 22 354-33-6, HFC 125 811-97-2, HFC 134a

2837-89-0, HCFC 124
RL: USES (Uses)
(refrigerant mixts. containing, flammability of, determination of, by ASTM
E 681
method)
IT 71-55-6, 1,1,1-Trichloroethane 74-98-6, Propane, uses 75-09-2,
Methylene chloride, uses 75-68-3, R 142b 109-66-0, Pentane, uses
115-10-6, Dimethyl ether 353-36-6, R 161 430-66-0, R 143 624-72-6,
Freon 152 1717-00-6, R 141b 7664-41-7, Ammonia, uses
RL: USES (Uses)
(refrigerants, flammability of, determination of, by ASTM E 681 method)
IT 75-10-5, R 32 (Refrigerant) 75-37-6, R 152a 420-46-2,
R 143a
RL: USES (Uses)
(refrigerants, pure or mixts., flammability of, determination of, by ASTM E
681
method)

L15 ANSWER 148 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1994:137837 CAPLUS
DN 120:137837
OREF 120:24239a,24242a
ED Entered STN: 19 Mar 1994
TI Refrigerants alternative to CFC (chlorofluorocarbon). Transport
properties. Viscosity
AU Takahashi, Shinji
CS Inst. Chem. React. Sci., Tohoku Univ., Sendai, 980, Japan
SO Reito (1993), 68(4), 392-400
CODEN: RITOA8; ISSN: 0034-3714
DT Journal; General Review
LA Japanese
CC 48-0 (Unit Operations and Processes)
Section cross-reference(s): 65
AB A review with 41 refs. of the viscosities of 14 alternative refrigerants
in the form of a liquid or vapor. The refrigerants are HFC-23, HFC-32,
HCFC-123, HCFC-123a, HCFC-124, HCFC-125, HFC-134, HFC-134a, HCFC-141b,
HCFC-142b, HFC-143a, HFC-152a, HCFC-225ca, and HCFC-225cb. Recommended or
calculated values of viscosities are described of the refrigerants mentioned
above or their mixts. in the form of a saturated liquid, saturated vapor, or
superheated vapor under an atmospheric pressure. However, only empirical
formulas are presented for the estimation of viscosities of the refrigerants in
the form of a liq.or superheated vapor both under a pressurized atmospheric
ST review viscosity alternative refrigerant; hydrofluorocarbon refrigerant
viscosity review
IT Viscosity
(of alternative refrigerants)
IT Refrigeration
(agents, viscosities of alternative)
IT Hydrocarbons, uses
RL: USES (Uses)
(chloro fluoro, refrigerants, viscosities of)
IT Hydrocarbons, uses
RL: USES (Uses)
(fluoro, refrigerants, viscosities of)
IT 75-10-5, HFC 32 75-37-6, HFC 152a 75-46-7, HFC 23 75-68-3,
HCFC 142b 306-83-2, HCFC 123 354-23-4, HCFC 123a 354-33-6
359-35-3, HFC 134 420-46-2, HFC 143a 422-56-0, HCFC 225ca
507-55-1, HCFC 225cb 811-97-2, HFC 134a 1717-00-6, HCFC 141b
2837-89-0, HCFC 124
RL: USES (Uses)
(refrigerant, viscosity of)

L15 ANSWER 149 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1994:80307 CAPLUS
DN 120:80307
OREF 120:14397a,14400a
ED Entered STN: 19 Feb 1994
TI Theoretical investigations of combustibility of refrigerants and refrigerant mixtures
AU Sicars, S.; Hesse, U.; Kruse, H.
CS FKW GmbH, Germany
SO DKV-Tagungsbericht (1992), 19th(Vol. 2, Pt. 1), 183-198
CODEN: DKVTDW; ISSN: 0172-8849
DT Journal
LA German
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 59
AB An approximation of the flammability and ignition hazard of non-alkane refrigerants consisted of calcn. of the mass-based heat of combustion, ΔHc0, of the refrigerant using a standard value corrected by a mol. structure-based correction factor, according to the equation ΔHc0 = -198.42 -615.14(N), in which N = Nc + EiΔNi [Nc is the number of carbon atoms and Ni are the structure corrections (e.g., -0.197 for -O-, -0.26 for F, etc.)]. Almost all flammable refrigerants have ΔHc0 >7.8 MJ/kg, whereas almost all nonflammable refrigerants have ΔHc0 <7.8 MJ/kg. Although the calculated values were almost always lower than exptl. determined values, the equation does have a practical value in that the calculated values were adequate in estimating the flammability and could be obtained with a min. of effort.
ST safety refrigerant flammability calcn; ignition hazard calcn refrigerant
IT Ignition
(hazard of, of non-alkane refrigerants, structure-based equation for approximation of)
IT Flammability
(of non-alkane refrigerants, calcn. of, structure-based equation for approximation of)
IT Heat of combustion
(of non-alkane refrigerants, calcn. of, structure-based equation for, flammability and ignition hazard in relation to)
IT Refrigeration
(agents, non-alkane, flammability and ignition hazard of, calcn. of, structure-based equation for approximation of)
IT Molecular structure-property relationship
(heat of combustion, of non-alkane refrigerants, flammability and ignition hazard in relation to)
IT 74-82-8, R50 (Refrigerant), properties 74-84-0, Ethane, properties 74-98-6, Propane, properties 75-09-2, R30 (Refrigerant), properties 75-10-5, R32 (Refrigerant) 75-37-6 75-45-6, R22 (Refrigerant) 75-46-7 75-68-3 75-69-4, R11 (Refrigerant) 75-71-8, R12 (Refrigerant) 75-72-9, R13 (Refrigerant) 75-73-0, R14 (Refrigerant) 76-13-1, R113 (Halocarbon) 76-14-2, R114 (Halocarbon) 76-15-3 306-83-2 353-36-6 354-33-6 420-46-2 431-89-0 811-97-2 1717-00-6 2837-89-0
RL: PRP (Properties)
(flammability of, estimation of, mol. structure-based equation for)

L15 ANSWER 150 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1994:56020 CAPLUS
DN 120:56020
OREF 120:10219a,10222a
ED Entered STN: 05 Feb 1994
TI Blowing agents for phenolic resin foams
IN Kamemura, Ichiro; Aoyanagi, Minako; Ootoshi, Yukio; Kamimura, Ginko; Kitamura, Tateo

PA   Asahi Glass Co Ltd, Japan
SO   Jpn. Kokai Tokkyo Koho, 5 pp.
     CODEN: JKXXAF
DT   Patent
LA   Japanese
IC   ICM C08J009-14
     ICS C08L061-04; C09K003-00
ICI C08L061-06
CC   37-6 (Plastics Manufacture and Processing)
     Section cross-reference(s): 45
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 05230265	A	19930907	JP 1992-72719	19920221
PRAI	JP 1992-72719		19920221		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
JP 05230265	ICM	C08J009-14
	ICS	C08L061-04; C09K003-00
	ICI	C08L061-06
	IPCI	C08J0009-14 [ICM,5]; C08J0009-00 [ICM,5,C*]; C08L0061-04 [ICS,5]; C09K0003-00 [ICS,5]; C08L0061-06 [ICI,5]; C08L0061-00 [ICI,5,C*]
	IPCR	C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C08L0061-00 [I,C*]; C08L0061-04 [I,A]; C08L0061-06 [I,A]; C09K0003-00 [I,C*]; C09K0003-00 [I,A]

AB   The title agents comprise C1-3 fluorohydrocarbons and perfluorocarbons. A resol phenolic resin 100, a silicone foam stabilizer 2, and an acid hardener 25 parts were mixed with CF_4, and the mixture was foamed and cured in a mold at 80° for 5 min to give a molding having d. 20-24 kg/m3, a good appearance, and high compressive strength.
ST   foam phenoplast blowing fluorocarbon; carbon tetrafluoride blowing phenoplast; perfluorocarbon blowing phenoplast foam; fluoromethane blowing phenoplast foam; fluoroethane blowing phenoplast foam; fluoropropane blowing phenoplast foam
IT   Blowing agents
        (fluorinated C1-3 hydrocarbons, for phenolic resins)
IT   Alkanes, uses
     RL: USES (Uses)
        (fluoro, blowing agents, for phenolic resins)
IT   Phenolic resins, miscellaneous
     RL: MSC (Miscellaneous)
        (resol, blowing agents for, fluoroalkanes as)
IT   75-10-5, Difluoromethane   75-37-6, 1,1-Difluoroethane   75-71-8, Dichlorodifluoromethane   75-72-9, Monochlorotrifluoromethane   75-73-0, Tetrafluoromethane   76-15-3, Monochloropentafluoroethane   76-16-4 76-19-7, Octafluoropropane 354-33-6, Pentafluoroethane 359-35-3, 1,1,2,2-Tetrafluoroethane   420-26-8   420-45-1, 2,2-Difluoropropane 420-46-2   421-07-8, 1,1,1-Trifluoropropane 421-48-7, 1,1,1,2-Tetrafluoropropane   430-61-5, 1,1-Difluoropropane 430-66-0, 1,1,2-Trifluoroethane   431-31-2, 1,1,1,2,3-Pentafluoropropane 431-63-0, 1,1,1,2,3,3-Hexafluoropropane   431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane   460-13-9   460-36-6, 1,1,1,3-Tetrafluoropropane 460-73-1   462-39-5, 1,3-Difluoropropane   677-56-5, 1,1,1,2,2,3-Hexafluoropropane   679-86-7, 1,1,2,2,3-Pentafluoropropane   680-00-2, 1,1,2,2,3,3-Hexafluoropropane   690-39-1, 1,1,1,3,3,3-Hexafluoropropane 811-94-9, 1,2,2-Trifluoropropane 811-97-2, 1,1,1,2-Tetrafluoroethane   813-75-2, 1,2,2,3-Tetrafluoropropane   931-91-9, Hexafluorocyclopropane   1814-88-6, 1,1,1,2,2-Pentafluoropropane 2252-84-8, 1,1,1,2,2,3,3-Heptafluoropropane   24270-66-4   24270-67-5,

1,1,3-Trifluoropropane 24270-68-6, 1,1,2,3-Tetrafluoropropane
40723-63-5, 1,1,2,2-Tetrafluoropropane 62126-90-3, 1,2-Difluoropropane
66794-30-7, 1,1,3,3-Tetrafluoropropane 66794-35-2, 1,1,2-
Trifluoropropane 66794-36-3, 1,2,3-Trifluoropropane
RL: USES (Uses)
(blowing agents, for phenolic resin foams)

L15 ANSWER 151 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1993:652702 CAPLUS
DN 119:252702
OREF 119:45049a,45052a
ED Entered STN: 11 Dec 1993
TI Refrigerants alternative to CFC (chlorofluorocarbon). Electrical and chemical properties
AU Tanaka, Yoshiyuki
CS Fac. Eng., Kobe Univ., Kobe, 657, Japan
SO Reito (1993), 68(4), 406-16
CODEN: RITOA8; ISSN: 0034-3714
DT Journal; General Review
LA Japanese
CC 48-0 (Unit Operations and Processes)
Section cross-reference(s): 76
AB A review, with 24 refs., including dielec. constant, dipole moment, dielec. breakdown voltage, and volume resistivity, of HFC-23, HFC-32, HFC-125, HFC-134a, HFC-143a, HFC-152a, HCFC-123, HCFC-124, HCFC-141b. Chemical properties (i.e., flammability, explosion limits, and toxicity) of HCFC-21, HCFC-22, HCFC-31, HCFC-32, HCFC-123, HFC-141b, HCFC-142b, HFC-23, HFC-32, HFC-41, HFC-134a, HFC-143, HFC-152a, etc., were also mentioned. The ozone depletion potential and global warming potential were also presented.
ST review elec property alternative refrigerant; ozone depletion alternative refrigerant review; global warming alternative refrigerant review; nonCFC refrigerant elec property review; safety flammability nonCFC refrigerant review
IT Explosion
Toxicity
(limits, of non-chlorofluorocarbon refrigerants)
IT Dielectric constant and dispersion
Dipole moment
Electric breakdown
Electric resistance
Flammability
(of non-chlorofluorocarbon refrigerants)
IT Refrigeration
(agents, chlorofluorocarbon alternatives, elec. and chemical properties of)
IT Climate
(greenhouse effect, potential of, by non-chlorofluorocarbon refrigerants)
IT Atmosphere
(stratosphere, ozone depletion in, potential of, by non-chlorofluorocarbon refrigerants)
IT 75-10-5, HFC-32 75-37-6, HFC-152a 75-43-4, HCFC 21 75-45-6,
HCFC-22 75-46-7, HFC-23 306-83-2, HCFC-123 354-33-6
420-46-2, HFC-143a 593-53-3, HFC 41 593-70-4, HCFC 31
811-97-2, HCFC-134a 1717-00-6, HCFC-141b 2837-89-0, HCFC-124
RL: USES (Uses)
(alternative refrigerant, elec. and chemical properties of)
IT 10028-15-6, Ozone, reactions
RL: PRP (Properties)
(depletion potential of, in atmospheric, by non-chlorofluorocarbon refrigerants)

L15 ANSWER 152 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1993:652701 CAPLUS
DN 119:252701
OREF 119:45049a,45052a
ED Entered STN: 11 Dec 1993
TI Refrigerants alternative to CFC (chlorofluorocarbon). Thermal conductivity
AU Yata, Junzo
CS Kyoto Inst. Technol., Kyoto, 606, Japan
SO Reito (1993), 68(4), 401-5
CODEN: RITOA8; ISSN: 0034-3714
DT Journal; General Review
LA Japanese
CC 48-0 (Unit Operations and Processes)
AB A review, with 18 refs., on the thermal conductivities of refrigerants considered to be alternatives to chlorofluorocarbons, with emphasis on HFC-32, HCFC-123, HCFC-124, HCFC-125, HFC-134a, HCFC-141b, HFC-143a, HFC-152a, HCFC-225ca, and HCFC-225cb. The thermal conductivities are given both as liqs. and vapors and as functions of temperature The general behavior of thermal conductivity of the refrigerants as liqs. was briefly mentioned. Measurements of the thermal conductivities of HFC-134a and HCFC-142b, as liqs. and as vapors, including the critical region, are described.
ST review thermal cond nonCFC refrigerant; chlorofluorocarbon refrigerant alternative thermal cond review
IT Thermal conductivity and conduction
(of non-chlorofluorocarbon refrigerants)
IT Refrigeration
(agents, non-chlorofluorocarbon, thermal conductivity of)
IT Hydrocarbons, properties
RL: PRP (Properties)
(chloro fluoro, refrigerants, alternatives for, thermal conductivity of)
IT 75-10-5, HFC-32 75-37-6, HFC-152a 75-68-3, HCFC-142b
306-83-2, HCFC-123 354-33-6 420-46-2, HFC-143a
422-56-0, HCFC-225ca 507-55-1, HCFC-225cb 811-97-2, HFC-134a
1717-00-6, HCFC-141b 2837-89-0, HCFC-124
RL: PRP (Properties)
(thermal conductivity of)

L15 ANSWER 153 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1993:583642 CAPLUS
DN 119:183642
OREF 119:32787a,32790a
ED Entered STN: 30 Oct 1993
TI Trends to the substitution of refrigerant R 22
AU Kruse, Horst
CS Germany
SO Statusbericht des Deutschen Kaelte- und Klimatechnischen Vereins (1992), 10, 1-4
CODEN: DDKVE3; ISSN: 0947-4129
DT Journal
LA German
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 59
AB Possible non-CFC-based substitutes for R22 (CHCIF2) refrigerant in compression refrigerating units were discussed based on environmental compatibility, toxicity, and flammability. There is only 1 halogenated C1-3-alhane, [i.e., R125(C2HF5)] that is non-flammable with the same approx. b. range, but it has a relatively high direct and indirect greenhouse effect potential, partially due to its low critical temperature
(66.3°). In general, there is no single compound that is a viable

substitute for R22. However, a number of possible mixts. of compds. exist, especially with R32 (CH2F2), R125, R134a (CF3CH2F), and R143a (CF3CH3) as components. The DuPont firm had announced plans for market introduction in 1993 of HP62 as a substitute for R22.

ST chlorofluorocarbon refrigerant R22 substitute; nonCFC refrigerant substitute; dichlorodifluoromethane refrigerant substitute; greenhouse effect potential chlorofluorocarbon substitute; toxicity chlorofluorocarbon refrigerant substitute; flammability chlorofluorocarbon refrigerant substitute

IT Flammability
(of refrigerant substitutes for dichlorodifluoromethane)

IT Refrigeration
(agents, non-chlorofluorocarbon-based as substitutes for dichlorodifluoromethane, for reduced greenhouse effect potential)

IT Climate
(greenhouse effect, potential of, possible dichlorodifluoromethane substitutes in relations to)

IT Atmosphere
(stratosphere, ozone depletion in, substitutes for chlorodifluoromethane refrigerant in relation to)

IT 10028-15-6, Ozone, uses
RL: USES (Uses)
(depletion of, in stratosphere, substitutes for chlorodifluoromethane refrigerant in relation to)

IT 75-45-6
RL: USES (Uses)
(possible substitutes for)

IT 150743-07-0, HP 62
RL: USES (Uses)
(refrigerant, non-CFC-based, as substitute for dichlorodifuoromethane)

IT 75-10-5 354-33-6 420-46-2 811-97-2
RL: USES (Uses)
(refrigerants containing, non-CFC-based, as substitutes for dichlorodifluoromethane, with reduced greenhouse effect potential)

L15 ANSWER 154 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1993:583354 CAPLUS
DN 119:183354
OREF 119:32747a,32750a
ED Entered STN: 30 Oct 1993
TI Working fluid composition for use in refrigeration system
IN Sawada, Hiroki; Hagihara, Toshiya; Kobayashi, Yuichiro; Sakai, Akimitsu; Suzuki, Hideo; Tanaka, Toshihiro; Nagumo, Hiroshi; Yokora, Yukinaga
PA Kao Corp., Japan
SO Eur. Pat. Appl., 17 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM C10M105-20
ICS C10M171-00; C09K005-04
ICI C10N040-30
CC 45-5 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 521650	A1	19930107	EP 1992-305841	19920625
	EP 521650	B1	19970813		
	R: DE, ES, FR, GB				
	JP 05009480	A	19930119	JP 1991-160297	19910701
	JP 2915173	B2	19990705		
	JP 05163499	A	19930629	JP 1991-352451	19911213
	JP 2913128	B2	19990628		

ES 2106143	T3	19971101	ES 1992-305841	19920625
US 5300245	A	19940405	US 1992-906449	19920630
US 5401433	A	19950328	US 1993-103115	19930809
PRAI JP 1991-160297	A	19910701		
JP 1991-352451	A	19911213		
US 1992-906449	A3	19920630		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 521650	ICM	C10M105-20
	ICS	C10M171-00; C09K005-04
	ICI	C10N040-30
	IPCI	C10M0105-20 [ICM,5]; C10M0105-00 [ICM,5,C*]; C10M0171-00 [ICS,5]; C09K0005-04 [ICS,5]; C09K0005-00 [ICS,5,C*]; C10N0040-30 [ICI,5]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-20 [I,A]; C10M0171-00 [I,A]; C10M0171-00 [I,C*]
	ECLA	C09K005/04B4B; C10M105/20; C10M171/00R
JP 05009480	IPCI	C10M0105-20 [ICM,5]; C10M0105-00 [ICM,5,C*]; C09K0005-04 [ICS,5]; C09K0005-00 [ICS,5,C*]; C10M0107-32 [ICS,5]; C10M0107-00 [ICS,5,C*]; C10N0040-30 [ICI,5]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-20 [I,A]; C10M0107-00 [I,C*]; C10M0107-32 [I,A]; C10N0040-30 [N,A]
JP 05163499	IPCI	C10M0169-04 [ICM,5]; C10M0169-04 [ICI,5]; C10M0169-00 [ICI,5,C*]; C10M0105-20 [ICI,5]; C10M0105-00 [ICI,5,C*]; C10M0131-02 [ICI,5]; C10M0131-00 [ICI,5,C*]; C10N0030-00 [ICI,5]; C10N0030-08 [ICI,5]; C10N0040-30 [ICI,5]; C10N0070-00 [ICI,5]
	IPCR	C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-20 [I,A]; C10N0030-00 [N,A]; C10N0030-08 [N,A]; C10N0040-30 [N,A]; C10N0070-00 [N,A]
ES 2106143	IPCI	C10M0105-20 [ICM,6]; C10M0105-00 [ICM,6,C*]; C10M0171-00 [ICS,6]; C09K0005-04 [ICS,6]; C09K0005-00 [ICS,6,C*]; C10N0040-30 [ICI,6]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-20 [I,A]; C10M0171-00 [I,A]; C10M0171-00 [I,C*]
US 5300245	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]; C10M0105-20 [ICS,5]; C10M0105-00 [ICS,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-20 [I,A]; C10M0171-00 [I,A]; C10M0171-00 [I,C*]
	NCL	252/068.000; 252/067.000
US 5401433	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C10M0105-20 [ICS,6]; C10M0105-00 [ICS,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-20 [I,A]; C10M0171-00 [I,A]; C10M0171-00 [I,C*]
	NCL	252/068.000; 252/067.000; 508/577.000; 508/578.000
	ECLA	C09K005/04B4B; C10M105/20; C10M171/00R

AB The title composition comprises a refrigerating oil comprising a compound containing $\geq$1 ketone group as a base oil and a hydrofluorocarbon. A composition contained 90 volume HFC 134a and 10 volume oil prepared by condensing 10 mol MEK with 0.5 mol HCHO and distilling off low-boiling compds.

ST ketone fluoroalkane working fluid refrigeration; MEK formaldehyde condensate refrigerant; tetrafluoroethane ketone refrigerant

IT Refrigeration

```
        (agents, aromatic ketone-fluorohydrocarbon mixts.)
IT   Ketones, uses
     RL: USES (Uses)
        (aryl, refrigerants containing fluorohydrocarbons and)
IT   Hydrocarbons, uses
     RL: USES (Uses)
        (fluoro, refrigerants containing ketone compds. and)
IT   89-74-7   110-13-4D, Acetonylacetone, reaction products with octene
     123-54-6D, Acetylacetone, reaction products with octene   579-74-8
     586-37-8, 1-Acetyl-3-methoxybenzene   776-99-8, 3.4-Dimethoxyphenylacetone
     5211-62-1, 2-Methoxyphenylacetone   6313-88-8   9008-59-7   10225-31-7
     23546-36-3   32933-07-6, 3-Acetyl-2,4-dimethylfuran   38861-78-8,
     1-Acetyl-4-isobutylbenzene   51729-17-0   150396-49-9   150396-50-2
     150396-51-3   150396-52-4
     RL: USES (Uses)
        (refrigerants containing fluorohydrocarbons and)
IT   75-10-5, HFC32   75-37-6, HFC152a 354-33-6, HFC125
     359-35-3, HFC134 420-46-2, HFC143a 811-97-2, HFC134a
     RL: USES (Uses)
        (refrigerants containing ketone compds. and)

L15  ANSWER 155 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1993:582079  CAPLUS
DN   119:182079
OREF 119:32559a,32562a
ED   Entered STN:  30 Oct 1993
TI   Blowing agent compositions and manufacture of thermoplastic resin
     foams using the same
IN   Omure, Yukio; Ide, Satoshi
PA   Daikin Industries, Ltd., Japan
SO   PCT Int. Appl., 41 pp.
     CODEN: PIXXD2
DT   Patent
LA   Japanese
IC   ICM  C08J009-14
     ICS  C09K003-00
CC   37-6 (Plastics Manufacture and Processing)
FAN.CNT 1
     PATENT NO.          KIND   DATE       APPLICATION NO.        DATE
     ---------------     ----   --------   --------------------   --------
PI   WO 9305105           A1    19930318   WO 1992-JP1169         19920914
         W:  CA, JP, US
         RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, SE
     EP 557533            A1    19930901   EP 1992-919512         19920914
         R:  DE, FR, GB, IT
PRAI JP 1991-233204       A     19910912
     JP 1991-233205       A     19910912
     JP 1991-247989       A     19910926
     JP 1991-247990       A     19910926
     JP 1991-247991       A     19910926
     JP 1991-247992       A     19910926
     WO 1992-JP1169       W     19920914
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 9305105      ICM    C08J009-14
                 ICS    C09K003-00
                 IPCI   C08J0009-14 [ICM,5]; C08J0009-00 [ICM,5,C*];
                        C09K0003-00 [ICS,5]
                 IPCR   C08J0009-00 [I,C*]; C08J0009-14 [I,A]
                 ECLA   C08J009/14H2F
 EP 557533       IPCI   C08J0009-14 [ICM,5]; C08J0009-00 [ICM,5,C*];
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C09K0003-00 [ICS,5]
IPCR C08J0009-00 [I,C*]; C08J0009-14 [I,A]

AB The title compns. providing thermoplastic resin foams with good uniformity and high compression strength and dimensional stability contain (A) pentafluoroethane, 1,1,1,2-tetrafluoroethane, and/or 1,1,1,2,3,3,3-heptafluoropropane and (B) difluoromethane and/or 1,1,1-trifluoroethane, or 1,1-difluoroethane and/or LPG. Polyethylene was foamed with 9.5 phr 80:20 mixture of pentafluoroethane and difluoromethane to give a stable foam with d. 0.044 g/cm3.

ST fluorocarbon foaming agent thermoplastic; polyethylene foaming agent fluorocarbon; LPG foaming agent thermoplastic

IT Blowing agents
(fluorocarbon-containing, for thermoplastics)

IT 102767-64-6
RL: USES (Uses)
(foaming agents containing fluorocarbons and, for thermoplastics)

IT 9002-88-4, Polyethylene
RL: USES (Uses)
(foaming agents for)

IT 75-10-5, Difluoromethane 75-37-6, 1,1-Difluoroethane 354-33-6, Pentafluoroethane 420-46-2, 1,1,1-Trifluoroethane 431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane 811-97-2, 1,1,1,2-Tetrafluoroethane
RL: USES (Uses)
(mixed foaming agents containing, for thermoplastics)

L15 ANSWER 156 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1993:563848 CAPLUS
DN 119:163848
OREF 119:29305a,29308a
ED Entered STN: 16 Oct 1993
TI Lubricating oils, consisting of neopentyl polyol esters or polyoxyalkylenes, for alternative fluoroalkane heat-transfer fluids
IN Corr, Stuart
PA Imperial Chemical Industries PLC, UK
SO Eur. Pat. Appl., 14 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM C09K005-04
CC 51-8 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 48
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 536940	A2	19930414	EP 1992-308922	19920930
	EP 536940	A3	19931103		
	EP 536940	B1	20011121		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, NL, PT, SE				
	AT 209242	T	20011215	AT 1992-308922	19920930
	ES 2168257	T3	20020616	ES 1992-308922	19920930
	FI 110949	B1	20030430	FI 1992-4476	19921005
	AU 9226242	A	19930422	AU 1992-26242	19921006
	AU 658005	B2	19950330		
	ZA 9207690	A	19930719	ZA 1992-7690	19921006
	JP 05239480	A	19930917	JP 1992-270312	19921008
	CA 2080278	A1	19930412	CA 1992-2080278	19921009
	CA 2080278	C	20040420		
	NO 9203943	A	19930413	NO 1992-3943	19921009
	NO 307793	B1	20000529		
	BR 9203942	A	19930427	BR 1992-3942	19921009

	IN 185893	A1	20010519	IN 1992-DE905	19921009
	CN 1072715	A	19930602	CN 1992-113072	19921010
	CN 1041748	C	19990120		
	US 6245254	B1	20010612	US 1997-976658	19971124
	US 20010023934	A1	20010927	US 2001-791628	20010226
	AU 2002029314	A	20020523	AU 2002-29314	20020328
	AU 781207	B2	20050512		
PRAI	GB 1991-21657	A	19911011		
	GB 1992-15602	A	19920722		
	AU 1992-26242	A	19921006		
	US 1992-957080	B1	19921007		
	US 1997-976658	A1	19971124		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 536940	ICM	C09K005-04
	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0030-06 [N,A]; C10N0040-30 [N,A]
	ECLA	C09K005/04B4B; C10M171/00R
AT 209242	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]; C10M0171-00 [ICS,7]; C10M0107-34 [ICS,7]; C10M0107-00 [ICS,7,C*]; C10M0105-38 [ICS,7]; C10M0105-00 [ICS,7,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0030-06 [N,A]; C10N0040-30 [N,A]
ES 2168257	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]; C10M0171-00 [ICS,7]; C10M0107-34 [ICS,7]; C10M0107-00 [ICS,7,C*]; C10M0105-38 [ICS,7]; C10M0105-00 [ICS,7,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0030-06 [N,A]; C10N0040-30 [N,A]
FI 110949	IPCI	C10M0105-38 [ICM,7]; C10M0105-00 [ICM,7,C*]; C09K0005-04 [ICS,7]; C09K0005-00 [ICS,7,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0030-06 [N,A]; C10N0040-30 [N,A]
AU 9226242	IPCI	C10M0105-54 [ICM,5]; C10M0105-00 [ICM,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0030-06 [N,A]; C10N0040-30 [N,A]
ZA 9207690	IPCI	C09K [ICM,5]
	IPCR	C09K [I,S]
JP 05239480	IPCI	C10M0105-18 [ICM,5]; C09K0005-04 [ICS,5]; C09K0005-00 [ICS,5,C*]; C10M0105-38 [ICS,5]; C10M0105-00 [ICS,5,C*]; C10N0030-06 [ICI,5]; C10N0040-30 [ICI,5]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0030-06 [N,A]; C10N0040-30 [N,A]
CA 2080278	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]; C10M0105-34 [ICS,5]; C10M0105-38 [ICS,5]; C10M0105-00 [ICS,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0030-06

[N,A]; C10N0040-30 [N,A]
NO 9203943 IPCI C10M0105-52 [ICM,5]; C10M0105-32 [ICS,5]; C10M0105-00 [ICS,5,C*]
IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0030-06 [N,A]; C10N0040-30 [N,A]
BR 9203942 IPCI C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0030-06 [N,A]; C10N0040-30 [N,A]
IN 185893 IPCI C10M0119-18 [ICM,7]; C10M0119-00 [ICM,7,C*]
IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0030-06 [N,A]; C10N0040-30 [N,A]
CN 1072715 IPCI C10M0131-04 [ICM,5]; C10M0131-00 [ICM,5,C*]
IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C10M0105-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0030-06 [N,A]; C10N0040-30 [N,A]
US 6245254 IPCI C09K0005-00 [ICM,7]
IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0171-00 [I,A]; C10M0171-00 [I,C*]
NCL 252/068.000; 252/067.000; 252/073.000
ECLA C09K005/04B4B; C10M171/00R; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N
US 20010023934 IPCI C09K0005-00 [ICM,7]; F25D0001-00 [ICS,7]
IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]
NCL 252/068.000; 252/067.000
ECLA C09K005/04B4B; C10M171/00R
AU 2002029314 IPCI C10M0105-54 [ICM,7]; C10M0105-00 [ICM,7,C*]
IPCR C10M0105-00 [I,C*]; C10M0105-54 [I,A]

OS MARPAT 119:163848

AB Non-chlorofluorocarbon heat-transfer fluid compns. consist of (1) a heat-transfer fluid composition comprised of a mixture of at least 2 hydrofluoroalkanes and fluoroalkanes, and (2) a lubricating oil that is at least partially soluble in each of the above components. Candidate heat-transfer fluids are chosen from difluoromethane, 1,1,2,2-tetrafluoroethane, 1,1,1,2-tetrafluoroethane, pentafluoroethane, 1,1,-difluoroethane, 1,1,1,-trifluoroethane, and 1,1,2-trifluoroethane; candidate lubricating oils are chosen from polyoxyalkylenes or neopentyl polyol esters (i.e., of pentaerythritol, dipentaerythritol, tripentaerythritol, trimethylolethane, trimethylolpropane, and neopentyl glycol). Such working fluids are characterized by a low min. miscibility temperature and environmental compatibility.

ST lubricating oil fluoroalkane refrigerant miscibility; alternative fluoroalkane refrigerant lubricating oil; heat transfer fluoroalkane lubricating oil; environmental compatible heat transfer fluid; tetrafluoroethane heat transfer lubricating oil; neopentyl polyol ester lubricating oil; polyoxyalkylene lubricating oil hydrofluorocarbon refrigerant

IT Polyoxyalkylenes, uses
RL: USES (Uses)
(lubricating oils, for fluoroalkane and hydrofluoroalkane heat transfer fluids, with low-temperature miscibility)

IT Fatty acids, esters
RL: USES (Uses)
(C6-9, esters, with neopentyl polyol, lubricating oils, for

fluoroalkane and hydrofluoroalkane heat transfer fluids, with
low-temperature
miscibility)
IT Fatty acids, esters
RL: USES (Uses)
(C8-10-branched, esters with pentaerythritol and heptanoic acids,
lubricating oils, for fluoroalkane and hydrofluoroalkane heat transfer
fluids, with low-temperature miscibility)
IT Fatty acids, esters
RL: USES (Uses)
(C9-11, esters, with neopentyl polyols, lubricating oils, for
fluoroalkane and hydrofluoroalkane heat transfer fluids, with
low-temperature
miscibility)
IT Heat transfer
Refrigeration
(agents, low-temperature, fluoroalkanes and hydrofluoroalkanes, miscible
ester lubricating oils for)
IT Fatty acids, esters
RL: USES (Uses)
(branched, esters with dipentaerythritol and hexanoic acid, lubricating
oils, for fluoroalkane and hydrofluoroalkane heat transfer fluids, with
low-temperature miscibility)
IT Alkanes, uses
RL: USES (Uses)
(fluoro, heat-transfer fluids containing, miscible ester lubricating oils
for)
IT Lubricating oils
(synthetic, esters, for fluoroalkane and hydrofluoroalkane heat
transfer fluids, with low-temperature miscibility)
IT 75-10-5, Difluoromethane 75-37-6, 1,1-Difluoroethane
354-33-6, Pentafluoroethane 359-35-3, 1,1,2,2-Tetrafluoroethane
420-46-2, 1,1,1-Trifluoroethane 430-66-0, 1,1,2-Trifluoroethane
811-97-2, 1,1,1,2-Tetrafluoroethane 29759-38-4,
Tetrafluoroethane
RL: USES (Uses)
(heat-transfer fluids containing, miscible ester lubricating oils for)
IT 77-85-0D, Trimethylolethane, esters 77-99-6D, esters 78-24-0D,
Tripentaerythritol, esters 115-77-5D, Pentaerythritol, esters with
heptanoic acid and C8-10-branched fatty acids 126-30-7D, esters
126-58-9D, Dipentaerythritol, esters with hexanoic acid and C6-branched
fatty acids 9003-11-6D, Ethylene oxide-propylene oxide copolymer,
derivs. 11138-46-8 68855-17-4 150260-50-7, Emkarate RL 184
150260-51-8, Emkarox RL 118
RL: USES (Uses)
(lubricating oils, for fluoroalkane and hydrofluoroalkane heat transfer
fluids, with low-temperature miscibility)

L15 ANSWER 157 OF 175 CAPLUS
AN 1993:498785 CAPLUS
DN 119:98785
OREF 119:17769a,17772a
ED Entered STN: 04 Sep 1993
TI Development trends of future replacement of refrigerants R 502 and R 22
for cooling applications at low temperatures of food cooling systems
AU Kruse, H.
CS Inst. Kaeltetech. Angewandte Waermetech., Univ. Hannover, Germany
SO Statusbericht des Deutschen Kaelte- und Klimatechnischen Vereins (1992),
11, 45 pp.
CODEN: DDKVE3; ISSN: 0947-4129
DT Journal
LA German

CC   48-5 (Unit Operations and Processes)
     Section cross-reference(s): 17, 59

AB   A market and technol. survey is presented for the evaluation of environmentally compatible (especially in relation to global warming and ozone depletion potentials) alternative refrigerants as possible replacements for R22 (CHClF2) and R502 (mixture of R22 with C2ClF6) com. refrigerants in low-temperature cooling, especially in the food industry. The evaluation focused on the technol. performance, heat transfer, flammability, environmental acceptability, and relevant US and German stds. R22 can only be a temporary substitute for R502 up to the year 2000 (due to German legal restrictions). Except for the flammable R125 (C2HCl5), there are no pure compds. that can be a substitute for R22. Instead, there are com. mixts. that are acceptable substitutes [e.g., R22-R152a-R124 (from DuPont) for R12, and R22-R290-R218 (from Rhone-Poulenc) and R22-R290-R125 (from DuPont) for R22. In addition, ternary mixts. of R32, R134a, R125, and R143a (from DuPont/Copeland and ICI) are possible substitutes for R22.

ST   alternative refrigerant chlorofluorocarbon replacement; heat transfer refrigerant chlorofluorocarbon replacement; global warming refrigerant chlorofluorocarbon replacement; flammability refrigerant chlorofluorocarbon replacement; ozone depletion refrigerant chlorofluorocarbon replacement; food refrigeration chlorofluorocarbon replacement

IT   Food
        (low-temperature refrigeration for, evaluation of environmentally acceptable replacement refrigerants for)

IT   Standards, legal and permissive
        (of chlorofluorocarbon refrigerants, evaluation of environmentally acceptable replacements in relation to)

IT   Flammability
        (of chlorofluorocarbons, evaluation of environmentally acceptable replacement refrigerants in relation to)

IT   Heat transfer
        (with chlorofluorocarbons, evaluation of environmentally acceptable replacement refrigerants in relation to)

IT   Refrigeration
        (agents, chlorofluorocarbon replacements, environmental acceptability of, for low-temperature cooling)

IT   Climate
        (greenhouse effect, by chlorofluorocarbons, evaluation of environmentally acceptable replacement refrigerants in relation to)

IT   10028-15-6, Ozone, miscellaneous
     RL: MSC (Miscellaneous)
        (depletion of, by chlorofluorocarbons, evaluation of environmentally acceptable replacement refrigerants in relation to)

IT   146732-63-0   149437-06-9   149437-07-0
     RL: USES (Uses)
        (refrigerant, evaluation of, as environmentally acceptable replacement for chlorofluorocarbons, in low-temperature cooling)

IT   74-98-6, Propane, uses   75-00-3 75-10-5, R32 (Refrigerant)
     75-28-5, Isobutane   75-37-6   75-46-7   75-68-3   106-97-8, Butane, uses
     306-83-2 354-33-6   359-35-3 420-46-2   431-89-0
     811-97-2   1691-17-4   1717-00-6, R 141b   1814-88-6   2837-89-0
     7664-41-7, Ammonia, uses
     RL: USES (Uses)
        (refrigerants containing, evaluation of, as environmentally acceptable replacements for chlorofluorocarbons, in low-temperature cooling)

IT   75-45-6   39432-81-0
     RL: USES (Uses)
        (replacement of, environmentally acceptable refrigerants for, evaluation of, in low-temperature cooling)

L15 ANSWER 158 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1993:451752 CAPLUS
DN 119:51752
OREF 119:9357a,9360a
ED Entered STN: 07 Aug 1993
TI Non-azeotropic refrigerant compositions comprising difluoromethane, 1,1,1-trifluoroethane, or propane
IN Richard, Robert Gerard; Shankland, Ian R.; Singh, Rajiv Ratna
PA Allied-Signal, Inc., USA
SO PCT Int. Appl., 22 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C09K005-04
CC 45-5 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9216597	A1	19921001	WO 1992-US1160	19920212
	W: AU, BB, BG, BR, CA, CS, FI, JP, KP, KR, LK, MG, MN, MW, NO, PL, RO, RU, SD				
	RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FR, GA, GB, GN, GR, IT, LU, MC, ML, MR, NL, SE, SN, TD, TG				
	IN 185532	A1	20010224	IN 1992-DE68	19920130
	AU 9216421	A	19921021	AU 1992-16421	19920212
	EP 576550	A1	19940105	EP 1992-908321	19920212
	EP 576550	B1	19960522		
	R: DE, ES, FR, GB, IT				
	JP 06506015	T	19940707	JP 1992-508154	19920212
	ES 2087536	T3	19960716	ES 1992-908321	19920212
	CA 2105565	C	20031104	CA 1992-2105565	19920212
	CN 1065085	A	19921007	CN 1992-101173	19920224
	CN 1035624	C	19970813		
	US 5736063	A	19980407	US 1996-736613	19961024
	US 6113803	A	20000905	US 1998-20662	19980209
	US 20020000534	A1	20020103	US 2000-562154	20000501
	US 20020121623	A1	20020905	US 2001-992999	20011106
	US 6500358	B2	20021231		
PRAI	US 1991-671270	A	19910318		
	WO 1992-US1160	A	19920212		
	US 1992-895254	B3	19920608		
	US 1995-452231	B1	19950526		
	US 1996-736613	A3	19961024		
	US 1998-20662	A3	19980209		
	US 2000-562154	B3	20000501		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 9216597	ICM	C09K005-04
	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]
	ECLA	C09K005/04B4B
IN 185532	IPCI	C09K0005-00 [ICM,7]
	IPCR	C09K0005-00 [I,C*]; C09K0005-00 [I,A]
AU 9216421	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]
EP 576550	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; F25B0001-00 [I,C*]; F25B0001-00 [I,A]
JP 06506015	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*];

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                         F25B0001-00 [ICS,5]
                   IPCR  C09K0005-00 [I,C*]; C09K0005-04 [I,A]; F25B0001-00
                         [I,C*]; F25B0001-00 [I,A]
 ES 2087536        IPCI  C09K0005-06 [ICM,6]; C09K0005-00 [ICM,6,C*];
                         A61K0031-665 [ICS,6]; A61K0009-00 [ICS,6]
                   IPCR  C09K0005-00 [I,C*]; C09K0005-04 [I,A]; F25B0001-00
                         [I,C*]; F25B0001-00 [I,A]
 CA 2105565        IPCI  C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
 CN 1065085        IPCI  C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
                   IPCR  C09K0005-00 [I,C*]; C09K0005-04 [I,A]; F25B0001-00
                         [I,C*]; F25B0001-00 [I,A]
 US 5736063        IPCI  C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
                   IPCR  C09K0005-00 [I,C*]; C09K0005-04 [I,A]
                   NCL   252/067.000; 062/114.000
                   ECLA  C09K005/04B4B
 US 6113803        IPCI  C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
                   IPCR  C09K0005-00 [I,C*]; C09K0005-04 [I,A]
                   NCL   252/067.000; 062/114.000
 US 20020000534    IPCI  C09K0005-00 [ICM,7]; C10M0101-00 [ICS,7]; F25D0001-00
                         [ICS,7]
                   IPCR  C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C10M0101-00
                         [I,C*]; C10M0101-00 [I,A]; F25D0001-00 [I,C*];
                         F25D0001-00 [I,A]
                   NCL   252/069.000; 252/067.000
 US 20020121623    IPCI  C09K0005-00 [ICM,7]; F25D0001-00 [ICS,7]
                   IPCR  C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04
                         [I,A]; F25D0001-00 [I,C*]; F25D0001-00 [I,A]
                   NCL   252/067.000
                   ECLA  C09K005/04B4B
AB   Fire-resistant refrigerant compns. with no ozone depletion potential and
     with vapor pressure comparable to HCFC-22 comprise 10-90% difluoromethane,
     1,1,1-trifluoroethane, and/or propane, 1-50% C1-3 hydrofluorocarbon, C1-3
     fluorocarbon, and/or inorg. compound with b.p. -90 to -50°, and 1-50%
     C1-3 hydrofluorocarbon (except 1,1,1-trifluoroethane) with b.p. -50 to
     -10°.
ST   refrigerant nonflammable ozone depletion; fluorohydrocarbon mixt
     refrigerant
IT   Fire-resistant materials
        (HFC-23-HFC-32-HFC-134a mixts., for non-ozone-depleting refrigerants)
IT   Refrigeration
        (agents, HFC-23-HFC-32-HFC-134a mixts., nonflammable and
        non-ozone-depleting)
IT   74-98-6, Propane, uses 75-10-5, Difluoromethane   75-46-7,
     Trifluoromethane   76-16-4, Hexafluoroethane   124-38-9, Carbon dioxide,
     uses 354-33-6, Pentafluoroethane   359-35-3,
     1,1,2,2-Tetrafluoroethane 420-46-2, 1,1,1-Trifluoroethane
     431-89-0, 1,1,1,2,3,3,3-Heptafluoropropane 811-97-2,
     1,1,1,2-Tetrafluoroethane   1814-88-6, 1,1,1,2,2-Pentafluoropropane
     2252-84-8, 1,1,1,2,2,3,3-Heptafluoropropane   2551-62-4, Sulfur
     hexafluoride
     RL: USES (Uses)
        (refrigerant compns. containing, nonflammable and non-ozone-depleting)
IT   148690-69-1
     RL: USES (Uses)
        (refrigerants, nonflammable and non-ozone-depleting)

L15  ANSWER 159 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1993:256990  CAPLUS
DN   118:256990
OREF 118:44636h,44637a
ED   Entered STN:  26 Jun 1993
TI   Refrigerant compositions containing mixtures of fluorocarbons
```

IN   Lindley, Andrew Arthur; Morrison, James David; Powell, Richard Llewellyn; Murphy, Frederick Thomas; Corr, Stuart
PA   Imperial Chemical Industries PLC, UK; Ineos Fluor Holdings Limited
SO   Eur. Pat. Appl., 12 pp.
     CODEN: EPXXDW
DT   Patent
LA   English
IC   ICM C09K005-04
CC   45-5 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 509673	A1	19921021	EP 1992-302837	19920331
	EP 509673	B1	19970312		
	EP 509673	B2	20031105		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, PT, SE				
	AT 150067	T	19970315	AT 1992-302837	19920331
	ES 2098444	T3	19970501	ES 1992-302837	19920331
	AU 9213959	A	19921022	AU 1992-13959	19920401
	AU 654176	B2	19941027		
	ZA 9202390	A	19921230	ZA 1992-2390	19920401
	CA 2065109	A1	19921019	CA 1992-2065109	19920403
	CA 2065109	C	20040210		
	KR 227877	B1	19991101	KR 1992-5891	19920409
	JP 05239450	A	19930917	JP 1992-95389	19920415
PRAI	GB 1991-8527	A	19910418		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 509673	ICM	C09K005-04
	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
AT 150067	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
ES 2098444	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
AU 9213959	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
ZA 9202390	IPCI	C09K [ICM,5]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
CA 2065109	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
KR 227877	IPCI	C09K0005-00 [ICM,7]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
JP 05239450	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]

AB   Refrigerant compns. with zero ozone depletion potential and low toxicity, flammability, and corrosivity contain ternary or higher mixts. of C2H2F4 and/or C3HF7, CH2F2 and/or MeCF3, and, optionally, C2HF5.
ST   ozone depletion atm refrigerant; tetrafluoroethane mixt refrigerant; heptafluoropropane mixt refrigerant; difluoromethane mixt refrigerant; trifluoroethane mixt refrigerant; pentafluoroethane mixt refrigerant
IT   Refrigeration
        (agents, fluorocarbon mixts., with low ozone depletion potential)
IT   75-10-5, Difluoromethane 354-33-6, Pentafluoroethane
     359-35-3, 1,1,2,2-Tetrafluoroethane 420-46-2,
     1,1,1-Trifluoroethane 811-97-2, 1,1,1,2-Tetrafluoroethane
     29759-38-4, Tetrafluoroethane   33660-75-2, Heptafluoropropane
     RL: USES (Uses)
        (refrigerant mixts. containing, with low ozone depletion potential)

L15 ANSWER 160 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1993:236668 CAPLUS
DN 118:236668
OREF 118:40957a,40960a
ED Entered STN: 12 Jun 1993
TI ARTI Refrigerant Database
AU Calm, J. M.
CS Arlington, VA, USA
SO Report (1992), DOE/CE/23810-2G; Order No. DE92015122, 56 pp. Avail.: NTIS
From: Energy Res. Abstr. 1992, 17(9), Abstr. No. 24967
DT Report
LA English
CC 48-5 (Unit Operations and Processes)
AB The refrigerant database consolidates and facilitates access to information to assist industry in developing equipment using alternative refrigerants. The underlying purpose is to accelerate phase out of chemical compds. of environmental concern. The database provides bibliog. citations and abstrs. for publications that may be useful in research and design of air-conditioning and refrigeration equipment. The complete documents are not included, though some may be added at a later date. The database identifies sources of specific information on R-32, R-123, R-124, R-125, R-134a, R-14b, R142b, R-143a, R-152a, R-290 (propane), R-727 (ammonia), ethers, and others as well as azeotropic and zeotropic blends of these fluids. It addresses polyalkylene glycol (PAG), ester, and other lubricants. It also refs. documents addressing compatibility of refrigerants and lubricants with metals, plastics, elastomers, motor insulation, and other materials used in refrigerant circuits.
ST refrigerant database abstr bibliog
IT Lubricants
(database of, for design of air conditioning and refrigeration equipment)
IT Esters, uses
Polyoxyalkylenes, uses
RL: USES (Uses)
(lubricants, database of, for design of air conditioning and refrigeration equipment)
IT Ethers, uses
RL: USES (Uses)
(refrigerants, database of, for design of air conditioning and refrigeration equipment)
IT Refrigeration
(agents, database of, for design of air conditioning and refrigeration equipment)
IT 74-98-6, Propane, uses 75-10-5, R 32 (Refrigerant) 75-37-6, r 152a 75-68-3, r 142b 306-83-2, r 123 354-33-6, r 125 420-46-2, r 143a 811-97-2, r 134a 1717-00-6, r 141b 2837-89-0, r 124 7664-41-7, Ammonia, uses
RL: USES (Uses)
(refrigerants, database of, for design of air conditioning and refrigeration equipment)

L15 ANSWER 161 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1993:215763 CAPLUS
DN 118:215763
OREF 118:37165a,37168a
ED Entered STN: 29 May 1993
TI Liquid refrigerants and refrigerant compositions
IN Powell, Richard Llewellyn; Lindley, Andrew Arthur; Corr, Stuart; Morrison, James David; Murphy, Frederick Thomas
PA Imperial Chemical Industries PLC, UK
SO Braz. Pedido PI, 24 pp.

CODEN: BPXXDX
DT Patent
LA Portuguese
IC ICM C09K005-04
CC 48-5 (Unit Operations and Processes)
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	BR 9201403	A	19921201	BR 1992-1403	19920415
PRAI	GB 1991-8527	A	19910418		
	GB 1992-6873	A	19920330		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
BR 9201403	ICM	C09K005-04
	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]

AB The liquid refrigerants comprise a ternary or higher order mixture consisting of C2H2F4 and/or C3HF7, CH2F2 and/or CF3CH3, and, optionally, C2HF5. The preferred liquid refrigerant consists of CF3CH2F (R 134a), CH2F2 (R 32), and C2HF5 (R 125). The heat exchange systems contain the liquid refrigerants and a lubricant. These refrigerant compns. are used to maintain temps. of -50° and even -65°, and are not harmful to the ozone layer because of their ability to react with atmospheric OH radicals. The properties of mixts. of R 32, R 134a, and R 125 in various ratios are presented.

ST R32 R134a R125 refrigerant; heating cooling refrigerant
IT Lubricants
(refrigerant compns. containing R 32 and R 125 and R 134a and, environmentally harmless)
IT Refrigeration
(agents, compns., R 32 and R 134a and R 125 in, environmentally harmless)
IT 420-46-2, R-143a
RL: USES (Uses)
(refrigerant compns. containing R 125 and R 134a and, environmentally harmless)
IT 75-10-5, R-32 (Refrigerant)
RL: USES (Uses)
(refrigerant compns. containing R 134a and R 125 and, environmentally harmless)
IT 354-33-6, R-125 359-35-3, R-134 811-97-2, R-134a
2252-84-8, Heptafluoropropane
RL: USES (Uses)
(refrigerant compns. containing R 32 and R 125 and, environmentally harmless)

L15 ANSWER 162 OF 175 CAPLUS
AN 1993:172316 CAPLUS
DN 118:172316
OREF 118:29499a,29502a
ED Entered STN: 01 May 1993
TI Fluoroalkyl-capped butylene oxide-based lubricating oils compatible with perhalo and partially halogenated hydrocarbon refrigerants
IN Thomas, Raymond Hilton Percival; Nalewajek, David; Pham Hang Thanh; Wilson, David Paul
PA Allied-Signal, Inc., USA
SO PCT Int. Appl., 39 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C10M107-38
ICS C10M111-04; C09K005-04

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ICI  C10M111-04, C10M101-02, C10M105-06, C10M105-32, C10M107-38; C10N020-02,
     C10N020-04, C10N040-30
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 2
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
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PI   WO 9208774           A1    19920529    WO 1991-US6970         19910925
         W:  AU, BB, BG, BR, CA, FI, HU, JP, KP, KR, LK, MC, MG, MW, NO, PL,
             RO, SD, SU
         RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, DE, DK, ES, FR, GA, GB, GN,
             GR, IT, LU, ML, MR, NL, SE, SN, TD, TG
     US 5154846           A     19921013    US 1990-614549         19901116
     AU 9186523           A     19920611    AU 1991-86523          19910925
     US 5254280           A     19931019    US 1992-922113         19920728
PRAI US 1990-614549       A     19901116
     US 1988-290120       A2    19881227
     WO 1991-US6970       A     19910925
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 9208774      ICM    C10M107-38
                 ICS    C10M111-04; C09K005-04
                 ICI    C10M111-04, C10M101-02, C10M105-06, C10M105-32,
                        C10M107-38; C10N020-02, C10N020-04, C10N040-30
                 IPCI   C10M0107-38 [ICM,5]; C10M0111-04 [ICS,5]; C09K0005-04
                        [ICS,5]; C09K0005-00 [ICS,5,C*]; C10M0111-04 [ICI,5];
                        C10M0111-00 [ICI,5,C*]; C10M0101-02 [ICI,5];
                        C10M0101-00 [ICI,5,C*]; C10M0105-06 [ICI,5];
                        C10M0105-32 [ICI,5]; C10M0105-00 [ICI,5,C*];
                        C10M0107-38 [ICI,5]; C10M0107-00 [ICI,5,C*];
                        C10N0020-02 [ICI,5]; C10N0020-04 [ICI,5]; C10N0040-30
                        [ICI,5]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0107-00
                        [I,C*]; C10M0107-38 [I,A]; C10M0111-00 [I,C*];
                        C10M0111-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00
                        [I,A]
                 ECLA   C09K005/04B; C10M107/38; C10M111/04; C10M171/00R; M10M;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M;
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                        M10M; M10M; M10N; M10N; M10N; M10N; M10N; M10N; M10N;
                        M10N; M10N; M10N; M10N
 US 5154846      IPCI   C10M0105-52 [ICM,5]; C10M0105-00 [ICM,5,C*];
                        C07C0043-12 [ICS,5]; C07C0043-00 [ICS,5,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0107-00
                        [I,C*]; C10M0107-38 [I,A]; C10M0111-00 [I,C*];
                        C10M0111-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00
                        [I,A]
                 NCL    252/068.000; 252/067.000
                 ECLA   C09K005/04B; C10M107/38; C10M111/04; C10M171/00R; M10M;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M;
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                        M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10M;
                        M10M; M10M; M10M; M10M; M10M; M10M; M10N; M10N; M10N;
                        M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N
 AU 9186523      IPCI   C10M0107-38 [ICM,5]; C10M0107-00 [ICM,5,C*];
                        C10M0111-04 [ICS,5]; C10M0111-00 [ICS,5,C*];
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                         C09K0005-04 [ICS,5]; C09K0005-00 [ICS,5,C*]
                  IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0107-00
                         [I,C*]; C10M0107-38 [I,A]; C10M0111-00 [I,C*];
                         C10M0111-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00
                         [I,A]
 US 5254280       IPCI   C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
                  IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0107-00
                         [I,C*]; C10M0107-38 [I,A]; C10M0111-00 [I,C*];
                         C10M0111-04 [I,A]; C10M0171-00 [I,A]; C10M0171-00
                         [I,C*]
                  NCL    252/068.000; 252/067.000
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OS   MARPAT 118:172316

AB   Lubricating oils for compression refrigeration and air conditioning units, compatible with perhalogenated and partially halogenated hydrocarbon refrigerants consist of polybutylene glycol-based polyoxyalkylenes capped at one or both ends with a fluoroalkyl group, with mol. weight 300-4000 and viscosity 5-150 cSt at 37°. The lubricating oils, optionally containing polyoxypropylene units, are especially compatible with partially halogenated chlorofluorocarbon substitute refrigerants [e.g., with CF3CFH2(R134a)]. A refrigerating lubricating oil, of formula F3CCH2(C4H8O)mCH2CF3 (m = 9, mol. weight 849) was miscible with CF3CFH2 (from -54 to >75°), was miscible with other com. lubricating oils (i.e., a petroleum oil, an alkylbenzene oil, and an ester oil), and passed a Falex wear test in the presence of R134a.

ST   refrigerating lubricating oil polybutylene glycol; fluoroalkyl capped polybutylene glycol lubricant; chlorofluorocarbon refrigerant polyoxyalkylene lubricating oil; CFC substitute refrigerant lubricating oil

IT   Refrigerating apparatus
        (fluoroalkyl-capped polybutylene glycol-based lubricating oils for)

IT   Lubricating oils
        (fluoroalkyl-capped polybutylene glycol-based, for refrigerators and air conditioners)

IT   Perhalocarbons
     RL: USES (Uses)
        (refrigerants, for refrigerators and air conditioners, fluoroalkyl-capped polybutylene glycol-based lubricating oils compatible with)

IT   Refrigeration
        (agents, perhalo and partially halogenated hydrocarbons, fluoroalkyl-capped polybutylene glycol-based lubricating oils for)

IT   Air conditioning
        (apparatus, fluoroalkyl-capped polybutylene glycol-based lubricating oils)

IT   Hydrocarbons, uses
     RL: USES (Uses)
        (chloro fluoro, refrigerants, for refrigerators and air conditioners, fluoroalkyl-capped polybutylene glycol-based lubricating oils compatible with)

IT   Polyoxyalkylenes, uses
     RL: USES (Uses)
        (fluoroalkyl group-terminated, lubricating oils, for refrigerators and air conditioners, compatible with perhalo and partially halogenated hydrocarbon refrigerants)

IT   145168-49-6   145168-50-9   145168-51-0   145168-52-1   145168-53-2
     145168-54-3   145168-55-4   145168-56-5   145168-57-6   145168-58-7
     145168-59-8   145168-60-1   145168-61-2   145168-62-3   145168-64-5
     145168-65-6   145168-66-7   145168-67-8   145168-68-9   145168-69-0
     145168-70-3   145168-71-4   145168-72-5   147012-80-4
     RL: USES (Uses)
        (lubricating oils containing, for refrigerators and air conditioners, compatible with perhalo and partially halogenated

hydrocarbon refrigerants)
IT 75-10-5 75-45-6 75-71-8 354-23-4 354-33-6
420-46-2 431-06-1 811-97-2, 1,1,1,2-Tetrafluoroethane
29759-38-4, Tetrafluoroethane 39432-81-0
RL: USES (Uses)
(refrigerant, for refrigerators and air conditioners, fluoroalkyl-capped polybutylene glycol-based lubricating oils compatible with)

L15 ANSWER 163 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1993:171726 CAPLUS
DN 118:171726
OREF 118:29415a,29418a
ED Entered STN: 01 May 1993
TI Thermophysical performance of CFC-alternatives in refrigeration systems
AU Lee, Ming Jer; Chao, Yi Long
CS Dep. Chem. Eng., Natl. Taiwan Inst. Technol., Taipei, 107, Taiwan
SO Journal of the Chinese Institute of Chemical Engineers (1992), 23(3), 143-51
CODEN: JCICAP; ISSN: 0368-1653
DT Journal
LA English
CC 48-5 (Unit Operations and Processes)
AB The thermophys. performances were evaluated of various working fluids at typical operating conditions in 4 types of refrigeration systems. The Iwai-Margerum-Lu equation of state was used to estimate the thermodn. properties of the refrigerants in the refrigeration cycle simulations. Among the fluids studied, HFC 1243 (trifluoropropene) and HFC 143a (1,1,1-trifluoroethane) have thermophys. capabilities comparable to those of the currently used CFC refrigerants. However, the flammability, poor oil solubility, and lubricity of such fluids must be taken into consideration for further applications.
ST thermophys performance alternative refrigerant; chlorofluorocarbon refrigerant alternative performance; hydrochlorofluorocarbon refrigerant performance; fluorocarbon refrigerant performance; hydrofluorocarbon refrigerant performance
IT Refrigeration
(agents, chlorofluorocarbon alternatives, performance of)
IT 74-98-6, Propane, uses 74-99-7, Methyl acetylene 75-10-5
75-19-4, Cyclopropane 75-37-6, HFC 152a 75-45-6, HCFC 22 75-68-3,
HCFC 142b 106-98-9, 1-Butene, uses 107-00-6, 1-Butyne 107-01-7,
2-Butene 115-07-1, Propylene, uses 115-10-6, Dimethyl ether
115-11-7, Iso-butylene, uses 306-83-2, HCFC 123 353-36-6 354-25-6,
HCFC 124a 354-33-6, HFC 125 420-46-2, HFC 143a
463-49-0, Propadiene 811-97-2, HFC 134a 2837-89-0, HCFC 124
7664-41-7, Ammonia, uses 32718-30-2
RL: USES (Uses)
(refrigerant, performance of)

L15 ANSWER 164 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1993:127597 CAPLUS
DN 118:127597
OREF 118:22059a,22062a
ED Entered STN: 30 Mar 1993
TI Constant boiling compositions of fluorinated hydrocarbons
IN Bivens, Donald Bernard; Shiflett, Mark Brandon; Yokozeki, Akimichi
PA du Pont de Nemours, E. I., and Co., USA
SO PCT Int. Appl., 20 pp.
CODEN: PIXXD2
DT Patent
LA English

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IC   ICM  C09K005-04
     ICS  C09K003-30
CC   48-5 (Unit Operations and Processes)
     Section cross-reference(s): 38, 50, 52, 76
FAN.CNT 3
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   WO 9211338           A1    19920709    WO 1991-US9144         19911212
         W:  AU, BR, CA, JP, KR
         RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, MC, NL, SE
     CN 1063301           A     19920805    CN 1991-112768         19911211
     CN 1029625           C     19950830
     IN 177534            A1    19970208    IN 1991-CA920          19911211
     CA 2098615           A1    19920618    CA 1991-2098615        19911212
     CA 2098615           C     20040330
     AU 9191738           A     19920722    AU 1991-91738          19911212
     EP 563305            A1    19931006    EP 1992-903843         19911212
     EP 563305            B1    19980826
     EP 563305            B2    20071121
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE
     BR 9107226           A     19940405    BR 1991-7226           19911212
     JP 06503832          T     19940428    JP 1991-503822         19911212
     JP 2585938           B2    19970226
     AT 170210            T     19980915    AT 1992-903843         19911212
     ES 2121844           T3    19981216    ES 1992-903843         19911212
     ZA 9109895           A     19930617    ZA 1991-9895           19911217
     ZA 9109896           A     19930617    ZA 1991-9896           19911217
     US 5643492           A     19970701    US 1995-392281         19950222
     US 5722256           A     19980303    US 1995-508760         19950627
     AU 9533130           A     19960229    AU 1995-33130          19951009
     AU 686434            B2    19980205
     US 5709092           A     19980120    US 1996-667107         19960620
     AU 2005200932        A1    20050324    AU 2005-200932         20050302
PRAI US 1990-628000       A     19901217
     US 1991-659210       A     19910222
     US 1991-649356       A2    19910201
     WO 1991-US9144       A     19911212
     US 1992-931371       B2    19920818
     US 1993-119522       B1    19930914
     US 1993-128435       B1    19930930
     US 1995-392281       A1    19950222
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 WO 9211338      ICM    C09K005-04
                 ICS    C09K003-30
                 IPCI   C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*];
                        C09K0003-30 [ICS,5]
                 IPCR   C07C0019-00 [I,C*]; C07C0019-08 [I,A]; A62D0001-00
                        [I,C*]; A62D0001-00 [I,A]; C08J0009-00 [I,C*];
                        C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30
                        [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A];
                        H01B0003-02 [I,C*]; H01B0003-16 [I,A]
                 ECLA   A62D001/00C6; C09K003/30; C09K005/04B; C09K005/04B4B
 CN 1063301      IPCI   C09K0005-00 [ICM,5]; B01F0003-00 [ICS,5]; A62D0001-00
                        [ICS,5]; C08K0005-02 [ICS,5]; C08K0005-00 [ICS,5,C*];
                        H01B0003-18 [ICS,5]
                 IPCR   C07C0019-00 [I,C*]; C07C0019-08 [I,A]; A62D0001-00
                        [I,C*]; A62D0001-00 [I,A]; C08J0009-00 [I,C*];
                        C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30
                        [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A];
                        H01B0003-02 [I,C*]; H01B0003-16 [I,A]
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IN 177534	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
CA 2098615	IPCR	C07C0019-00 [I,C*]; C07C0019-08 [I,A]; A62D0001-00 [I,C*]; A62D0001-00 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; H01B0003-02 [I,C*]; H01B0003-16 [I,A]
AU 9191738	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]; C09K0003-30 [ICS,5]
EP 563305	IPCI	C09K0005-00 [I,C]; C09K0005-04 [I,A]; C09K0003-30 [I,C]; C09K0003-30 [I,A]
	IPCR	C07C0019-00 [I,C*]; C07C0019-08 [I,A]; A62D0001-00 [I,C*]; A62D0001-00 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; H01B0003-02 [I,C*]; H01B0003-16 [I,A]
	ECLA	A62D001/00C6; C09K003/30; C09K005/04B; C09K005/04B4B
BR 9107226	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]; C09K0003-30 [ICS,5]
	IPCR	C07C0019-00 [I,C*]; C07C0019-08 [I,A]; A62D0001-00 [I,C*]; A62D0001-00 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; H01B0003-02 [I,C*]; H01B0003-16 [I,A]
	ECLA	A62D001/00C6; C09K003/30; C09K005/04B; C09K005/04B4B
JP 06503832	IPCI	C07C0019-08 [ICM,5]; C07C0019-00 [ICM,5,C*]; C08J0009-14 [ICS,5]; C08J0009-00 [ICS,5,C*]; C09K0003-30 [ICS,5]; C09K0005-04 [ICS,5]; C09K0005-00 [ICS,5,C*]; H01B0003-16 [ICS,5]; H01B0003-02 [ICS,5,C*]; C08L0101-00 [ICI,5]
	IPCR	C07C0019-00 [I,C*]; C07C0019-08 [I,A]; A62D0001-00 [I,C*]; A62D0001-00 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; H01B0003-02 [I,C*]; H01B0003-16 [I,A]
AT 170210	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C09K0003-30 [ICS,6]
	IPCR	C07C0019-00 [I,C*]; C07C0019-08 [I,A]; A62D0001-00 [I,C*]; A62D0001-00 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; H01B0003-02 [I,C*]; H01B0003-16 [I,A]
ES 2121844	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C09K0003-30 [ICS,6]
ZA 9109895	IPCI	C07C [ICS,5]
	IPCR	C07C [I,S]; F25B [I,S]
ZA 9109896	IPCI	F25B [ICM,5]; C07C [ICS,5]
	IPCR	C07C [I,S]; F25B [I,S]
US 5643492	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
	IPCR	A62D0001-00 [I,C*]; A62D0001-00 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	NCL	252/067.000; 062/114.000; 510/410.000
	ECLA	A62D001/00C6; C09K003/30; C09K005/04B; C09K005/04B4B
US 5722256	IPCI	F25B0001-00 [ICM,6]; C09K0005-04 [ICS,6]; C09K0005-00 [ICS,6,C*]
	IPCR	A62D0001-00 [I,C*]; A62D0001-00 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	NCL	062/502.000; 062/114.000; 062/498.000; 252/067.000
	ECLA	A62D001/00C6; C09K003/30; C09K005/04B
AU 9533130	IPCI	C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]; C09K0003-30 [ICS,6]; A62D0001-06 [ICS,6]; A62D0001-00

[ICS,6,C*]; C08K0005-02 [ICS,6]; C08K0005-00 [ICS,6,C*]
IPCR C07C0019-00 [I,C*]; C07C0019-08 [I,A]; A62D0001-00 [I,C*]; A62D0001-00 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; H01B0003-02 [I,C*]; H01B0003-16 [I,A]

US 5709092
IPCI C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*]
IPCR A62D0001-00 [I,C*]; A62D0001-00 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]
NCL 062/114.000; 252/067.000
ECLA A62D001/00C6; C09K003/30; C09K005/04B

AU 2005200932
IPCI C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]; C08K0005-02 [ICS,7]; C08K0005-00 [ICS,7,C*]; A62D0001-06 [ICS,7]; A62D0001-00 [ICS,7,C*]; C09K0003-30 [ICS,7]
IPCR C07C0019-00 [I,C*]; C07C0019-08 [I,A]; A62D0001-00 [I,C*]; A62D0001-00 [I,A]; C08J0009-00 [I,C*]; C08J0009-14 [I,A]; C09K0003-30 [I,C*]; C09K0003-30 [I,A]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; H01B0003-02 [I,C*]; H01B0003-16 [I,A]

AB The compns. comprise .apprx.10-90 (.apprx.13-23 weight%) C2HF5, .apprx.10-90 (.apprx.77-87 weight%) CH2F2, and optionally CHClF2, CH2FCF3, CHF2CHF2, CF3CH3, CH5F, C3F8, C3H8, CHF3, and/or CF3CHFCF3. The compns. are useful as refrigerants, aerosol propellants, heat-transfer media, gaseous dielecs., fire extinguishing agents, expansion agents for polyolefins and polyurethanes, and as power cycle working fluids.

ST ethane methane fluorinated const boiling; hydrocarbon fluorinated const boiling; refrigerant ethane methane fluorinated; aerosol propellant ethane methane fluorinated; dielec ethane methane fluorinated; heat transfer ethane methane fluorinated; fire extinguisher ethane methane fluorinated; expansion agent polyolefin hydrocarbon fluorinated; polyolefin expansion agent hydrocarbon fluorinated; polyurethane expansion agent hydrocarbon fluorinated; power working fluid hydrocarbon fluorinated; working fluid power hydrocarbon fluorinated

IT Urethane polymers, miscellaneous
RL: USES (Uses)
(expansion agents for, fluorinated hydrocarbons, constant boiling)

IT Electric insulators and Dielectrics
(fluorinated hydrocarbons, constant boiling)

IT Power
(generation of, working fluids for, fluorinated hydrocarbons, constant boiling)

IT Sprays
(propellants for, fluorinated hydrocarbons, constant boiling)

IT Heat transfer
Refrigeration
(agents, fluorinated hydrocarbons, constant boiling)

IT Fire
(extinguishers, fluorinated hydrocarbons, constant boiling)

IT Alkenes, polymers
RL: USES (Uses)
(polymers, expansion agents for, fluorinated hydrocarbons, constant boiling)

IT 354-33-6, HFC 125
RL: USES (Uses)
(constant boiling compns. of difluoromethane and)

IT 74-98-6, Propane, uses 75-45-6, Chlorodifluoromethane 75-46-7, Trifluoromethane 76-19-7, Octafluoropropane 353-36-6, Fluoroethane 359-35-3, HFC 134 420-46-2, HFC 143a 431-89-0, HFC 227ea 811-97-2, HFC 134a
RL: USES (Uses)

(constant boiling compns. of difluoromethane and pentafluoroethane containing)
IT   75-10-5, Difluoromethane
     RL: USES (Uses)
        (constant boiling compns. of pentafluoroethane and)

L15 ANSWER 165 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1992:514303 CAPLUS
DN   117:114303
OREF 117:19890h,19891a
ED   Entered STN: 20 Sep 1992
TI   Thermodynamic evaluation of five alternative refrigerants in vapor-compression cycles
AU   Kazachki, G. S.; Gage, C. L.
CS   Acurex Corp., Research Triangle Park, NC, USA
SO   Report (1991), EPA/600/D-91/159; Order No. PB91-223297, 12 pp. Avail.: NTIS
     From: Gov. Rep. Announce. Index (U. S.) 1991, 91(21), Abstr. No. 158,796
DT   Report
LA   English
CC   48-5 (Unit Operations and Processes)
AB   Results of a thermodn. evaluation of five alternative refrigerants in a vapor-compression refrigeration cycle, utilizing throttling, superheating, and combined throttling and superheating are given. Five alternative refrigerants (R32, R125, R134a, R143a, and R152a) were considered for refrigerants R12, R22, and R502. Thermodynamically, the best alternative for R12 in a wide range of evaporation and condensing temps. is R152a, which should be applied in a cycle without internal heat exchange. The second alternative is R134a, which should be applied in a cycle with internal heat exchange. Between R143a and R125, both of which should be applied in a cycle with internal heat exchange, the better replacement thermodynamically for R502 is R143a, particularly at high condensing temps. At low condensing temps., R125 is to be considered, especially if extended internal heat exchange is applied. As a replacement for R502, R32 has good performance and much higher volumetric capacity. However, excessively high discharge temps. contraindicate its use, particularly with hermetic and semi-hermetic compressors. No internal heat exchange should be applied with R32, and extreme care should be taken to prevent superheating in suction lines.
ST   thermodn evaluation refrigerant alternative; vapor compression cycle refrigerant alternative
IT   Refrigeration
        (of vapor-compression cycles, evaluation of alternative refrigerants in)
IT   Refrigeration
        (agents, thermodn. evaluation of alternative, in vapor-compression cycles)
IT   75-10-5, r 32, Refrigerant   75-37-6, r 152a 354-33-6, r 125 420-46-2, r 143a 811-97-2, r 134a
     RL: USES (Uses)
        (refrigerant, thermodn. evaluation of, in vapor-compression cycles)

L15 ANSWER 166 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1992:154439 CAPLUS
DN   116:154439
OREF 116:26117a,26120a
ED   Entered STN: 17 Apr 1992
TI   Thermodynamic property predictions for refrigerant mixtures
AU   Lee, Ming Jer; Sun, Hsueh Cheng
CS   Dep. Chem. Eng., Natl. Taiwan Inst. Technol., Taipei, 106, Taiwan
SO   Industrial & Engineering Chemistry Research (1992), 31(4), 1212-16
     CODEN: IECRED; ISSN: 0888-5885

DT   Journal
LA   English
CC   48-5 (Unit Operations and Processes)
     Section cross-reference(s): 68, 69
AB   The vapor-liquid equilibrium data of various refrigerant mixts. are correlated by
     the Soave, Patel-Teja, and Iwai-Margerum-Lu equations of state, with one adjustable binary interaction constant, ka12. The Patel-Teja equation is slightly better than others. A generalized equation for ka12 is, then, developed that enables the Patel-Teja equation to preduct the equilibrium-phase properties for such mixts. within reasonable accuracy. With the aid of this model, the bubble and dew pressures are predicted for 55 binary nonchlorofluorocarbon (non-CFC) refrigerant mixts. containing HCFC-22, HFC-32, HCFC-123, HCFC-124, HFC-125, HFC-134a, HCFC-142b, HFC-143a, HFC-152a, HFC-1243, and Me2O at 233.15-363.15.K over the entire composition range. Among those mixts., 13 binary systems are possible to form azeotropes according to the predictions, and the mixts. of HCFC-124/HCFC-142b and HFC-134a/Me2O can work as near-azeotropic refrigerants.
ST   thermodn property prediction refrigerant mixt; vapor liq equil refrigerant mixt; bubble pressure refrigerant mixt model; dew pressure refrigerant mixt model; equation state vapor liq equil; state equation refrigerant mixt
IT   Equation of state
        (for vapor-liquid equilibrium of refrigerant mixts.)
IT   Thermodynamics
        (of binary nonchlorofluorocarbon refrigerant mixts., math. modeling of)
IT   Refrigeration
        (agents, binary nonchlorofluorocarbon mixts., thermodn. properties of, math. modeling of)
IT   Equilibrium
        (liquid-vapor, of binary nonchlorofluorocarbon refrigerant mixts., math. modeling of)
IT   75-10-5   75-37-6   75-45-6, HCFC 22   75-68-3   115-10-6, Dimethyl ether   306-83-2, HCFC 123 354-33-6, HFC 125 420-46-2, HFC 143a 811-97-2   2837-89-0, HCFC 124
     RL: USES (Uses)
        (mixture containing, thermodn. properties of, math. modeling of)

L15 ANSWER 167 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN   1992:109422 CAPLUS
DN   116:109422
OREF 116:18495a,18498a
ED   Entered STN: 20 Mar 1992
TI   Refrigerant
IN   Omure, Yukio; Noguchi, Masahiro; Fujiwara, Katsuki; Momota, Hiroshi
PA   Daikin Industries, Ltd., Japan
SO   Eur. Pat. Appl., 10 pp.
     CODEN: EPXXDW
DT   Patent
LA   English
IC   ICM C09K005-00
CC   48-5 (Unit Operations and Processes)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 451692	A2	19911016	EP 1991-105295	19910403
	EP 451692	A3	19920318		
	EP 451692	B1	19960904		
	R: BE, DE, FR, GB, IT, NL				
	JP 03287688	A	19911218	JP 1990-90775	19900404
	JP 2792191	B2	19980827		
	JP 10219237	A	19980818	JP 1998-55491	19900404

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     EP 626434            A2    19941130    EP 1994-110634         19910403
     EP 626434            B1    19980114
         R:  BE, DE, FR, GB, IT, NL
     EP 626435            A2    19941130    EP 1994-110635         19910403
     EP 626435            A3    19970730
         R:  BE, DE, FR, GB, IT, NL
     AU 9174076           A     19911010    AU 1991-74076          19910404
     AU 641740            B2    19930930
     US 6183660           B1    20010206    US 1997-934208         19970919
     US 6187219           B1    20010213    US 1999-228654         19990112
PRAI JP 1990-90775        A     19900404
     EP 1991-105295       A3    19910403
     US 1991-680251       B1    19910404
     US 1992-994074       B3    19921216
     US 1994-270576       A3    19940705
     US 1997-934208       A3    19970919
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
 --------------  -----  ----------------------------------------------
 EP 451692       ICM    C09K005-00
                 IPCI   C09K0005-00 [ICM,5]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
                 ECLA   C09K005/04B4B
 JP 03287688     IPCI   C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
 JP 10219237     IPCI   C09K0005-04 [ICM,6]; C09K0005-00 [ICM,6,C*];
                        F25B0001-00 [ICS,6]
 EP 626434       IPCI   C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
                 ECLA   C09K005/04B4B
 EP 626435       IPCI   C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
                 ECLA   C09K005/04B4B
 AU 9174076      IPCI   C07C0019-08 [ICM,5]; C07C0019-00 [ICM,5,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
 US 6183660      IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
                 NCL    252/067.000; 062/114.000
                 ECLA   C09K005/04B4B
 US 6187219      IPCI   C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]
                 NCL    252/067.000; 062/114.000
                 ECLA   C09K005/04B4B
AB   The refrigerant composition comprises a mixture of 3 hydrofluorocarbons ClHnFn.
     When l = 1, m = 1,2, n = 2,3, and m + n = 4.  When l = 2, m = 1-4, n =
     2-5, and m + n = b.  When l = 3, m = 1-3, n = 5-7, and m + n = 8.
     Optionally m/(m + n) <0.5.  Suitable refrigerant compns. include HFC 134a,
     HFC 125, and HFC 143a; HFC 134a, HFC 125, and HFC 152a; HFC 134a, HFC 125,
     and HFC 32; HFC 134a, HFC 152a, and HFC 32; HFC 134a, HFC 143a, and HFC
     32; and HFC 134a, HFC 152a, and HFC 143a.
ST   refrigerant hydrofluorocarbon mixt
IT   Refrigeration
        (agents, hydrofluorocarbon composition as)
IT   75-10-5   75-37-6, HFC 152a 354-33-6, HFC 125
     420-46-2, HFC 143a 811-97-2, HFC 134a
     RL: USES (Uses)
        (refrigerant composition containing, hydrofluorocarbon)

L15  ANSWER 168 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1992:84986  CAPLUS
DN   116:84986
OREF 116:14483a,14486a
ED   Entered STN:  06 Mar 1992
TI   Thermoplastic and thermosetting resin foams containing gas
     barrier resins and their manufacture
```

IN Bartlett, Philip Lee; Creazzo, Joseph Anthony; Hammel, Howard Sims
PA du Pont de Nemours, E. I., and Co., USA
SO PCT Int. Appl., 33 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C08G009-00
ICS C08G009-14
CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 38
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9114724	A2	19911003	WO 1991-US847	19910213
	WO 9114724	A3	19920319		
	W: AU, BR, CA, JP, KR, PL, SU				
	RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, NL, SE				
	AU 9173066	A	19911021	AU 1991-73066	19910213
	EP 521877	A1	19930113	EP 1991-904683	19910213
	R: DE, ES, FR, GB, IT, NL				
	JP 05505634	T	19930819	JP 1991-504542	19910213
	CN 1055187	A	19911009	CN 1991-101776	19910323
	US 5532284	A	19960702	US 1995-390911	19950217
PRAI	US 1990-500050	A	19900323		
	WO 1991-US847	A	19910213		
	US 1992-882247	B1	19920508		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 9114724	ICM	C08G009-00
	ICS	C08G009-14
	IPCI	C08G0009-00 [ICM,1]; C08G0009-14 [ICS,1]
	IPCR	C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-14 [I,A]; C08L0101-00 [I,C*]; C08L0101-00 [I,A]
	ECLA	C08J009/00L; C08J009/14
AU 9173066	IPCI	C08J0009-00 [ICM,5]; C08J0009-14 [ICS,5]
	IPCR	C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-14 [I,A]; C08L0101-00 [I,C*]; C08L0101-00 [I,A]
EP 521877	IPCI	C08J0009-00 [ICM,5]; C08J0009-14 [ICS,5]
	IPCR	C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-14 [I,A]; C08L0101-00 [I,C*]; C08L0101-00 [I,A]
JP 05505634	IPCI	C08J0009-14 [ICM,5]; C08J0009-00 [ICM,5,C*]; C08L0101-00 [ICS,5]
	IPCR	C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-14 [I,A]; C08L0101-00 [I,C*]; C08L0101-00 [I,A]
CN 1055187	IPCI	C08L0023-08 [ICM,5]; C08L0023-00 [ICM,5,C*]; C08J0009-02 [ICS,5]; C08J0009-00 [ICS,5,C*]
	IPCR	C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-14 [I,A]; C08L0101-00 [I,C*]; C08L0101-00 [I,A]
US 5532284	IPCR	C08J0009-00 [I,C*]; C08J0009-00 [I,A]; C08J0009-14 [I,A]
	NCL	521/134.000; 521/131.000; 521/137.000; 521/142.000; 521/155.000

AB Closed-cell polymer foams blown with halocarbon or halohydrocarbon blowing agents contain a gas-barrier resin uniformly dispersed in the continuous polymeric phase. The gas-barrier resins, e.g., acrylic or ethylenic copolymers, significantly reduce the escape of blowing agent from and/or entry of air into the foam, thereby improving their thermal insulation value. Thus, the permeation rate of polystyrene film with respect to HCFC-22 gas decreased by 76.0% in the presence of 5.0 weight% Elvax 40 barrier resin.
ST thermoplastic foam gas barrier resin; thermoset foam

gas barrier resin; ethylene copolymer gas barrier polystyrene; vinyl acetate copolymer gas barrier; thermal insulator foam gas barrier

IT Polyisocyanurates
RL: USES (Uses)
(cellular, containing gas barrier resin, with reduced gas permeation)

IT Phenolic resins, miscellaneous
Urethane polymers, miscellaneous
RL: MSC (Miscellaneous)
(cellular, containing gas barrier resin, with reduced gas permeation)

IT Mica-group minerals, uses
RL: USES (Uses)
(gas-barrier resins containing, for thermosetting and thermoplastic polymer foams)

IT Blowing agents
(halocarbons and hydrocarbons and Me formate, for thermoplastic and thermosetting polymer foams)

IT Polyamides, uses
RL: USES (Uses)
(thermoplastic and thermosetting polymer foams containing, with reduced gas permeability)

IT Thermal insulators
(thermosetting and thermoplastic polymer foams containing gas barrier resins as, with improved insulation value)

IT Hydrocarbons, uses
RL: USES (Uses)
(C3-6, blowing agents, thermoplastic and thermosetting polymer foams prepared with, containing gas-barrier resins)

IT Rubber, synthetic
RL: USES (Uses)
(ethylene-Me acrylate-mono-Et maleate, thermoplastic and thermosetting polymer foams containing Vamac G, with reduced gas permeability)

IT 75-10-5, Difluoromethane 75-37-6 75-45-6 75-68-3 75-69-4, Trichlorofluoromethane 75-71-8, Dichlorodifluoromethane 76-13-1 76-14-2 107-31-3, Methyl formate 124-38-9, Carbon dioxide, uses 306-83-2 354-33-6 359-35-3 420-46-2 624-72-6 811-97-2 812-04-4 1717-00-6 2837-89-0
RL: USES (Uses)
(blowing agents, thermoplastic and thermosetting polymer foams prepared with, containing gas-barrier resins)

IT 9003-53-6, Polystyrene
RL: USES (Uses)
(cellular Dylene 8, containing gas-barrier resin, with reduced gas permeation)

IT 9002-86-2, Poly(vinyl chloride) 9002-88-4, Polyethylene 9003-07-0, Polypropylene
RL: USES (Uses)
(cellular, containing gas-barrier resin, with reduced gas permeation)

IT 54545-50-5
RL: USES (Uses)
(rubber, thermoplastic and thermosetting polymer foams containing, with reduced gas permeability)

IT 25608-33-7
RL: USES (Uses)
(thermoplastic and thermosetting polymer foams containing Elvacite 2016, with reduced gas permeability)

IT 24937-78-8, Ethylene-vinyl acetate copolymer
RL: USES (Uses)
(thermoplastic and thermosetting polymer foams containing Elvax 40, with reduced gas permeability)

IT 9011-06-7
RL: USES (Uses)

(thermoplastic and thermosetting polymer foams containing Saran 516, with reduced gas permeability)

IT 25067-34-9, Ethylene-vinyl alcohol copolymer
RL: USES (Uses)
(thermoplastic and thermosetting polymer foams containing Selar OH 3007, with reduced gas permeability)

IT 25750-23-6 58814-83-8
RL: USES (Uses)
(thermoplastic and thermosetting polymer foams containing Selar PA 3246, with reduced gas permeability)

IT 9002-89-5, Elvanol 90-50 24937-79-9 24968-79-4, Acrylonitrile-methyl acrylate copolymer
RL: USES (Uses)
(thermoplastic and thermosetting polymer foams containing, with reduced gas permeability)

L15 ANSWER 169 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1992:62319 CAPLUS
DN 116:62319
OREF 116:10727a,10730a
ED Entered STN: 21 Feb 1992
TI Performance simulation of a two-evaporator refrigerator-freezer charged with pure and mixed refrigerants
AU Jung, D. S.; Radermacher, R.
CS Dep. Mech. Eng., Univ. Maryland, College Park, MD, 20742, USA
SO International Journal of Refrigeration (1991), 14(5), 254-63
CODEN: IJRFDI; ISSN: 0140-7007
DT Journal
LA English
CC 48-5 (Unit Operations and Processes)
AB A computer simulation of 2-evaporator refrigerators charged with pure and mixed refrigerants operating on a Lorentz and Meutzner's cycle was performed to determine possible substitutes for R12 with an improved energy efficiency. The results for pure fluids indicate that the coeffs. of performance (COPs) and volumetric capacities obtained with 2-evaporator units are enhanced up to 6 and 15.5%, resp., compared to those with single evaporator units. This is due to some of the evaporation occurring at higher temps. in the 2-evaporator units. For mixts., a significant increase in COP of ≤18% is observed by matching the large overall drop in temperature of the air streams, 23°, with that of refrigerant mixts. in the evaporator. The evaporator area ratio is a very important parameter and depends largely on the load distribution between the 2 compartments. The effect of the low temperature heat exchanger is studied by varying its size.
As
the size increases, the COP also increases with a decreased pressure ratio across the compressor. An optimized 2-evaporator refrigerator -freezer unit charged with alternative, O3-safe refrigerant mixts. may increase the energy efficiency considerably, helping to alleviate the environmental impact of refrigeration.
ST performance simulation evaporator refrigerator freezer; refrigerant evaporator refrigerator simulation
IT Heat transfer
(by pure and mixed refrigerants, performance simulation in)

IT 75-10-5 75-37-6, R 152a 75-45-6, R 22 75-46-7, R 23 75-68-3, R 142b 306-83-2, R 123 354-33-6, R 125 420-46-2, R 143a 811-97-2, R 134a 2837-89-0, R 124
RL: USES (Uses)
(heat transfer by, in refrigerator-freezer systems, performance simulation of)

L15 ANSWER 170 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1991:635384 CAPLUS

DN 115:235384
OREF 115:40101a,40104a
ED Entered STN: 29 Nov 1991
TI Performance simulation of single-evaporator domestic refrigerators
charged with pure and mixed refrigerants
AU Jung, D. S.; Radermacher, R.
CS Dep. Mech. Eng., Univ. Maryland, College Park, MD, 20742, USA
SO International Journal of Refrigeration (1991), 14(4), 223-32
CODEN: IJRFDI; ISSN: 0140-7007
DT Journal
LA English
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 59
AB A computer simulation of single-evaporator domestic refrigerators
charged with pure and mixed refrigerants was performed in an attempt to
screen out the best substitutes for R12. In simulating a steady-state
thermal system, both successive substitution and Newton-Raphson methods
were employed independently and yielded the same results without any
significant difference in their performance. An extensive screening was
carried out for 15 pure and 21 mixed refrigerants. The results indicated
that few pure fluids may be drop-in replacements for R12 due to mismatch
of volumetric capacity, even if some fluids such as R22, R152a, R142b, and
R141b have a comparable coefficient of performance (COP) to that of R12. Only
R22-R142b, and R32-R142b mixts. yielded increases in COP of ≤3%
with the same capacity as that of R12. In the short run, these mixts. may
be substituted for R12, thus helping to solve the O3 layer depletion
problem without a significant change in energy efficiency. More efficient
heat exchangers are recommended as one of the means of increasing energy
efficiency.
ST evaporator refrigerator computer simulation; refrigerant single
evaporator computer simulation
IT Refrigerating apparatus
(performance simulation of, charged with pure and mixed refrigerants)
IT Refrigeration
(agents, pure and mixed, single-evaporator domestic
refrigerator charged with, performance simulation of)
IT 75-10-5, R32 (Refrigerant) 75-37-6 75-45-6 75-63-8 75-68-3
75-69-4, R11 (Refrigerant) 75-71-8, R12 (Refrigerant) 76-14-2
306-83-2 354-33-6 359-35-3 420-46-2 811-97-2
1717-00-6 2837-89-0
RL: USES (Uses)
(pure and mixed, single-evaporator domestic refrigerators
charged with, performance simulation of)

L15 ANSWER 171 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1991:85174 CAPLUS
DN 114:85174
OREF 114:14511a,14514a
ED Entered STN: 09 Mar 1991
TI Refrigerating machine oil
IN Omure, Yukio; Fujiwara, Katsuki; Tsuchiya, Tatsumi; Hishida, Satoshi;
Noguchi, Masahiro; Yamamoto, Ikuo
PA Daikin Industries, Ltd., Japan
SO Eur. Pat. Appl., 10 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM C09K005-04
CC 51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE

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PI   EP 396109            A1    19901107    EP 1990-108283         19900501
     EP 396109            B1    19940817
         R:  DE, FR, GB, IT
     JP 03205491          A     19910906    JP 1990-116522         19900501
     JP 2508883           B2    19960619
     US 5066410           A     19911119    US 1990-517329         19900501
PRAI JP 1989-112987       A     19890502
     JP 1989-265609       A     19891011
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 EP 396109       ICM    C09K005-04
                 IPCI   C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]
                 IPCR   C10M0105-00 [I,C*]; C10M0105-54 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C10M0107-00 [I,C*];
                        C10M0107-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00
                        [I,A]; C10N0040-25 [N,A]; C10N0040-30 [N,A]
                 ECLA   C09K005/04B4B; C10M107/38; C10M171/00R
 JP 03205491     IPCI   C10M0105-54 [ICM,5]; C10M0105-00 [ICM,5,C*];
                        C10M0107-38 [ICS,5]; C10M0107-00 [ICS,5,C*];
                        C10N0040-25 [ICI,5]
                 IPCR   C10M0105-00 [I,C*]; C10M0105-54 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C10M0107-00 [I,C*];
                        C10M0107-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00
                        [I,A]; C10N0040-25 [N,A]; C10N0040-30 [N,A]
 US 5066410      IPCI   C09K0005-00 [ICM,5]
                 IPCR   C10M0105-00 [I,C*]; C10M0105-54 [I,A]; C09K0005-00
                        [I,C*]; C09K0005-04 [I,A]; C10M0107-00 [I,C*];
                        C10M0107-38 [I,A]; C10M0171-00 [I,C*]; C10M0171-00
                        [I,A]; C10N0040-25 [N,A]; C10N0040-30 [N,A]
                 NCL    252/068.000
                 ECLA   C09K005/04B4B; C10M107/38; C10M171/00R; M10M; M10M;
                        M10M; M10M; M10M; M10M; M10N; M10N; M10N; M10N; M10N;
                        M10N; M10N; M10N; M10N; M10N
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AB   An oil for a refrigerating machine using a H-containing halogenated hydrocarbon as a refrigerant comprises a F-containing polyether having repeated units represented by the formula (CF2CF2CF2O)l(CHFCF2CF2O)m(CH2CF2CF2O)n, where l, m, and n are all an pos. integer, but (l+m+n) = 2-200, and [(m+2l)+100/(l+m+n)+2] = 60-95. The F-containing polyether contains CH2OH, CF2CF3, or COOCH2CH2OC6H5 group as a substituent at one or both of terminals.


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ST   refrigerating machine oil polyether; fluorine contg polyether
     refrigerator oil; refrigerant fluorine contg polyether oil
IT   Lubricants
     Lubricating oils
        (fluorine-containing polyethers, with hydrogen-containing halogenated
        hydrocarbon refrigerants, for refrigerating apparatus)
IT   Polyethers, uses and miscellaneous
     RL: USES (Uses)
        (fluorine-containing, refrigerator oil, with hydrogen-containing
        halogenated hydrocarbon refrigerants)
IT   Fluoropolymers
     RL: USES (Uses)
        (polyether-, refrigerator oil, with hydrogen-containing
        halogenated hydrocarbon refrigerants)
IT   75-10-5 354-33-6 420-46-2 811-97-2
     2837-89-0
     RL: USES (Uses)
        (refrigerant, with fluorine-containing polyether oils, for
        refrigerators)
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AN   1991:27079  CAPLUS
DN   114:27079
OREF 114:4751a,4754a
ED   Entered STN:  26 Jan 1991
TI   Esterified polyglycol lubricants for refrigeration compressors
IN   McGraw, Philip W.; Ward, Eldon L.; Edens, Michael W.
PA   Dow Chemical Co., USA
SO   U.S., 6 pp.
     CODEN: USXXAM
DT   Patent
LA   English
IC   ICM  C10M105-34
     ICS  C10M105-38
INCL 252068000
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     ---------------     ----   --------    --------------------   --------
PI   US 4959169           A     19900925    US 1989-425621         19891020
     CA 2044258           A1    19910421    CA 1990-2044258        19901011
     WO 9105831           A1    19910502    WO 1990-US5840         19901011
         W:  AU, BR, CA, JP, KR, NO
         RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, NL, SE
     AU 9066066           A     19910516    AU 1990-66066          19901011
     AU 628234            B2    19920910
     EP 454801            A1    19911106    EP 1990-915610         19901011
     EP 454801            B1    19940615
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE
     BR 9006973           A     19911112    BR 1990-6973           19901011
     JP 04500836          T     19920213    JP 1990-514584         19901011
     JP 07005902          B     19950125
     ES 2055450           T3    19940816    ES 1990-915610         19901011
     ZA 9008405           A     19920624    ZA 1990-8405           19901019
     NO 9102390           A     19910819    NO 1991-2390           19910619
     KR 140977            B1    19980615    KR 1991-700630         19910619
PRAI US 1989-425621       A     19891020
     WO 1990-US5840       A     19901011
CLASS
 PATENT NO.      CLASS  PATENT FAMILY CLASSIFICATION CODES
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 US 4959169      ICM    C10M105-34
                 ICS    C10M105-38
                 INCL   252068000
                 IPCI   C10M0105-34 [ICM,5]; C10M0105-38 [ICS,5]; C10M0105-00
                        [ICS,5,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00
                        [I,C*]; C10M0105-38 [I,A]; C10M0105-50 [I,A];
                        C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0107-38
                        [I,A]; C10M0111-00 [I,C*]; C10M0111-02 [I,A];
                        C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02
                        [N,A]; C10N0020-04 [N,A]; C10N0030-08 [N,A];
                        C10N0040-30 [N,A]
                 NCL    252/068.000; 062/114.000
                 ECLA   C10M107/34; C10M171/00R; M10M; M10M; M10M; M10M; M10M;
                        M10M; M10M; M10N
 CA 2044258      IPCI   C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*];
                        C10M0145-38 [ICS,5]; C10M0145-00 [ICS,5,C*]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00
                        [I,C*]; C10M0105-38 [I,A]; C10M0105-50 [I,A];
                        C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0107-38
                        [I,A]; C10M0111-00 [I,C*]; C10M0111-02 [I,A];
                        C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02
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[N,A]; C10N0020-04 [N,A]; C10N0030-08 [N,A]; C10N0040-30 [N,A]

WO 9105831	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]; C10M0145-38 [ICS,5]; C10M0145-00 [ICS,5,C*]; C10N0040-30 [ICI,5]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0105-50 [I,A]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0107-38 [I,A]; C10M0111-00 [I,C*]; C10M0111-02 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0020-04 [N,A]; C10N0030-08 [N,A]; C10N0040-30 [N,A]
	ECLA	C10M107/34; C10M171/00R; M10M; M10M; M10M; M10M; M10M; M10M; M10M; M10N
AU 9066066	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]; C10M0145-38 [ICS,5]; C10M0145-00 [ICS,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0105-50 [I,A]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0107-38 [I,A]; C10M0111-00 [I,C*]; C10M0111-02 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0020-04 [N,A]; C10N0030-08 [N,A]; C10N0040-30 [N,A]
EP 454801	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]; C10M0145-38 [ICS,5]; C10M0145-00 [ICS,5,C*]; C10N0040-30 [ICI,5]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0105-50 [I,A]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0107-38 [I,A]; C10M0111-00 [I,C*]; C10M0111-02 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0020-04 [N,A]; C10N0030-08 [N,A]; C10N0040-30 [N,A]
BR 9006973	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]; C10M0145-38 [ICS,5]; C10M0145-00 [ICS,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0105-50 [I,A]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0107-38 [I,A]; C10M0111-00 [I,C*]; C10M0111-02 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0020-04 [N,A]; C10N0030-08 [N,A]; C10N0040-30 [N,A]
JP 04500836	IPCI	C10M0105-38 [ICM,5]; C10M0105-00 [ICM,5,C*]; C09K0005-04 [ICS,5]; C09K0005-00 [ICS,5,C*]; C10M0107-38 [ICS,5]; C10M0107-00 [ICS,5,C*]; C10N0020-04 [ICI,5]; C10N0040-30 [ICI,5]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0105-50 [I,A]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0107-38 [I,A]; C10M0111-00 [I,C*]; C10M0111-02 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0020-04 [N,A]; C10N0030-08 [N,A]; C10N0040-30 [N,A]
ES 2055450	IPCI	C09K0005-04 [ICM,4]; C09K0005-00 [ICM,4,C*]; C10M0145-38 [ICS,4]; C10M0145-00 [ICS,4,C*]; C10N0040-30 [ICI,5]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00 [I,C*]; C10M0105-38 [I,A]; C10M0105-50 [I,A]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0107-38 [I,A]; C10M0111-00 [I,C*]; C10M0111-02 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0020-04 [N,A]; C10N0030-08 [N,A];

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                        C10N0040-30 [N,A]
 ZA 9008405      IPCI   C09K [ICM,5]; C10M [ICS,5]; C10N [ICS,5]
                 IPCR   C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0105-00
                        [I,C*]; C10M0105-38 [I,A]; C10M0105-50 [I,A];
                        C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0107-38
                        [I,A]; C10M0111-00 [I,C*]; C10M0111-02 [I,A];
                        C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02
                        [N,A]; C10N0020-04 [N,A]; C10N0030-08 [N,A];
                        C10N0040-30 [N,A]
 NO 9102390      IPCR   C09K [I,S]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M
                        [I,S]; C10M0145-00 [I,C*]; C10M0145-38 [I,A]
 KR 140977       IPCI   C09K0005-04 [ICM]; C09K0005-00 [ICM,C*]; C10M0145-38
                        [ICS]; C10M0145-00 [ICS,C*]
AB   Compression refrigeration fluid compns. which have an upper
     solution critical temperature .gtorsim.35° are composed of selected
     hydrochlorofluorocarbons and hydrofluorocarbons with esterified polyether
     polyols in which >30% of the hydroxyls are esterified.  The esterified
     polyether polyols have a viscosity ≥5-15 cSt at 38°.
ST   refrigerant fluid hydrochlorofluorocarbon lubricant polyol;
     hydrofluorocarbon lubricant polyether polyol refrigeration;
     esterified polyether polyol lubricant refrigeration
IT   Lubricants
        (esterified polyether polyols, with refrigerants, for compression
        refrigeration)
IT   Refrigeration
        (agents, hydrofluorocarbons and hydrochlorofluorocarbons, with
        esterified polyether polyols lubricants, for compression
        refrigeration)
IT   37286-69-4   62576-71-0   76308-92-4   131278-99-4   131279-00-0
     RL: USES (Uses)
        (lubricant, refrigeration fluids containing refrigerants and)
IT   75-10-5   75-37-6, 1,1-Difluoroethane   75-45-6,
     Chlorodifluoromethane   75-46-7, Trifluoromethane   75-68-3,
     1-Chloro-1,1-difluoroethane   75-88-7, 1-Chloro-2,2,2-trifluoroethane
     306-83-2   354-25-6 354-33-6, Pentafluoroethane   359-35-3,
     1,1,2,2-Tetrafluoroethane 420-46-2, 1,1,1-Trifluoroethane
     593-53-3, Methylfluoride   593-70-4, Chlorofluoromethane 811-97-2
     , 1,1,1,2-Tetrafluoroethane   1320-41-8, Difluoroethylene   1717-00-6
     2837-89-0, 1-Chloro-1,2,2,2-tetrafluoroethane
     RL: USES (Uses)
        (refrigerant, refrigeration fluids containing esterified
        polyether polyol lubricants and)

L15  ANSWER 173 OF 175  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   1990:594725  CAPLUS
DN   113:194725
OREF 113:32919a,32922a
ED   Entered STN:  23 Nov 1990
TI   Polyglycol lubricants for refrigeration compressors and process
     for preparing them
IN   McGraw, Philip W.
PA   Dow Chemical Co., USA
SO   Eur. Pat. Appl., 7 pp.
     CODEN: EPXXDW
DT   Patent
LA   English
IC   ICM  C10M107-34
     ICS  C09K005-04; C10M169-04
ICI  C10M169-04, C10M105-52, C10M145-30, C10M145-34, C10M149-12; C10N040-30
CC   51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1
     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
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PI	EP 379175	A1	19900725	EP 1990-100925	19900117
	EP 379175	B1	19950524		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL				
	US 5021180	A	19910604	US 1989-432958	19891107
	JP 02269195	A	19901102	JP 1990-727	19900108
	BR 9000201	A	19911008	BR 1990-201	19900116
	CA 2007912	A1	19900718	CA 1990-2007912	19900117
	NO 9000239	A	19900719	NO 1990-239	19900117
	AU 9048557	A	19900726	AU 1990-48557	19900117
	AU 632785	B2	19930114		
	CN 1044292	A	19900801	CN 1990-100249	19900117
	ZA 9000335	A	19910925	ZA 1990-335	19900117
	ES 2072319	T3	19950716	ES 1990-100925	19900117
	KR 160282	B1	19990218	KR 1990-512	19900117
PRAI	US 1989-298534	A	19890118		
	US 1989-432958	A	19891107		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
EP 379175	ICM	C10M107-34
	ICS	C09K005-04; C10M169-04
	ICI	C10M169-04, C10M105-52, C10M145-30, C10M145-34, C10M149-12; C10N040-30
	IPCI	C10M0107-34 [ICM,5]; C10M0107-00 [ICM,5,C*]; C09K0005-04 [ICS,5]; C09K0005-00 [ICS,5,C*]; C10M0169-04 [ICS,5]; C10M0169-04 [ICI,5]; C10M0169-00 [ICI,5,C*]; C10M0105-52 [ICI,5]; C10M0105-00 [ICI,5,C*]; C10M0145-30 [ICI,5]; C10M0145-34 [ICI,5]; C10M0145-00 [ICI,5,C*]; C10M0149-12 [ICI,5]; C10M0149-00 [ICI,5,C*]; C10N0040-30 [ICI,5]
	IPCR	C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04 [I,A]; C09K0005-08 [I,A]; C10M0105-62 [I,A]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0040-30 [N,A]
	ECLA	C09K005/04B; C10M171/00R; C10M107/34; C10M169/04B
US 5021180	IPCI	C09K0005-04 [ICM,5]; C09K0005-00 [ICM,5,C*]; C10M0129-08 [ICS,5]; C10M0129-00 [ICS,5,C*]
	IPCR	C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04 [I,A]; C09K0005-08 [I,A]; C10M0105-62 [I,A]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0040-30 [N,A]
	NCL	252/068.000
	ECLA	C09K005/04B; C10M107/34; C10M169/04B; C10M171/00R; M10M; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N; M10N
JP 02269195	IPCI	C10M0105-18 [ICM,5]; C10M0105-62 [ICS,5]; C10M0105-00 [ICS,5,C*]; C09K0005-00 [ICA,5]; C10N0020-02 [ICI,5]; C10N0040-30 [ICI,5]
BR 9000201	IPCI	C10M0107-32 [ICM,5]; C10M0107-00 [ICM,5,C*]; C10N0040-22 [ICS,5]
	IPCR	C10M0107-00 [I,C*]; C10M0107-32 [I,A]; C10N0040-22 [N,A]
CA 2007912	IPCI	C09K0005-04 [ICM]; C09K0005-00 [ICM,C*]
	IPCR	C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04 [I,A];

C09K0005-08 [I,A]; C10M0105-62 [I,A]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0040-30 [N,A]

NO 9000239	IPCI	C10M0111-00 [ICM,5]
	IPCR	C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04 [I,A]; C09K0005-08 [I,A]; C10M0105-62 [I,A]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0040-30 [N,A]
AU 9048557	IPCI	C10M0107-32 [ICM,5]; C10M0107-00 [ICM,5,C*]
	IPCR	C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04 [I,A]; C09K0005-08 [I,A]; C10M0105-62 [I,A]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0040-30 [N,A]
CN 1044292	IPCI	C10M0107-32 [ICM,5]; C10M0107-00 [ICM,5,C*]
	IPCR	C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04 [I,A]; C09K0005-08 [I,A]; C10M0105-62 [I,A]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0040-30 [N,A]
ZA 9000335	IPCI	C10M [ICM,5]; C09K [ICS,5]; C10N [ICS,5]
	IPCR	C09K [I,S]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M [I,S]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10N [N,A]
ES 2072319	IPCI	C10M0107-34 [ICM,5]; C10M0107-00 [ICM,5,C*]; C09K0005-04 [ICS,5]; C09K0005-00 [ICS,5,C*]; C10M0169-04 [ICS,5]; C10M0169-04 [ICI,5]; C10M0169-00 [ICI,5,C*]; C10M0105-52 [ICI,5]; C10M0105-00 [ICI,5,C*]; C10M0145-30 [ICI,5]; C10M0145-34 [ICI,5]; C10M0145-00 [ICI,5,C*]; C10M0149-12 [ICI,5]; C10M0149-00 [ICI,5,C*]; C10N0040-30 [ICI,5]
	IPCR	C10M0105-00 [I,C*]; C10M0105-18 [I,A]; C09K0005-00 [I,C*]; C09K0005-00 [I,A]; C09K0005-04 [I,A]; C09K0005-08 [I,A]; C10M0105-62 [I,A]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0040-30 [N,A]
KR 160282	IPCI	C10M0107-34 [ICM,7]; C10M0107-00 [ICM,7,C*]
	IPCR	C09K [I,S]; C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M [I,S]; C10M0107-00 [I,C*]; C10M0107-34 [I,A]; C10N [N,A]

AB A refrigeration fluid composition for compression refrigeration which has an upper solution critical temperature of ≥60° comprises (A) ≥1 selected hydrochlorofluorocarbons and hydrofluorocarbons and (B) polyether polyols having viscosities of >80 cSt (at 38°) and having a number average mol. weight of 400-2000 where the polyols are the residue of an active H compound such as glycerin or ethylenediamine.

ST polyether polyol lubricant refrigeration fluid; compressor refrigeration fluid polyether polyol; glycerin polyglycol lubricant refrigeration fluid; ethylenediamine polyglycol lubricant refrigeration fluid; refrigerant polyglycol lubricant compressor fluid

IT Lubricants
(polyether polyols, refrigerants containing, for compressors)

IT Polyethers, uses and miscellaneous
RL: USES (Uses)

(hydroxy-containing, Lubricants, refrigerants containing, for compressors)
IT 25791-96-2 51178-86-0, Ethylenediamine-propylene oxide adduct
RL: USES (Uses)
(lubricant, refrigerants containing, for compressors)
IT 75-10-5 75-37-6 75-45-6, Chlorodifluoromethane 75-46-7, Trifluoromethane 75-68-3 75-88-7, 1-Chloro-2,2,2-trifluoroethane 306-83-2, 2,2-Dichloro-1,1,1-trifluoroethane 354-25-6 354-33-6 , Pentafluoroethane 359-35-3, 1,1,2,2-Tetrafluoroethane 420-46-2 , 1,1,1-Trifluoroethane 593-53-3, Methyl fluoride 593-70-4, Chlorofluoromethane 811-97-2, 1,1,1,2-Tetrafluoroethane 1320-41-8, Difluoroethylene 1717-00-6 2837-89-0, 1-Chloro-1,2,2,2,-tetrafluoroethane
RL: USES (Uses)
(refrigerant, containing polyether polyol lubricants, for compressors)

L15 ANSWER 174 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1990:443017 CAPLUS
DN 113:43017
OREF 113:7305a,7308a
ED Entered STN: 03 Aug 1990
TI Thermodynamic properties of CFC [chlorofluorocarbon] alternatives: a survey of the available data
AU McLinden, Mark O.
CS Cent. Chem. Technol., Natl. Inst. Stand. Technol., Boulder, CO, 80303-3328, USA
SO International Journal of Refrigeration (1990), 13(3), 149-62
CODEN: IJRFDI; ISSN: 0140-7007
DT Journal
LA English
CC 48-5 (Unit Operations and Processes)
Section cross-reference(s): 65, 68, 69
AB The thermodn. properties of 10 halogenated hydrocarbons are collected from a variety of sources, including unpublished data. Considered are the triple point, normal b.p. and critical point parameters, and the temperature dependence of the vapor pressure, saturated liquid d., and ideal-gas heat capacity. Also considered are the single-phase pressure-volume-temperature data.
The saturation and ideal-gas data are fitted to simple correlations. The fluids, which are potential alternatives to the fully halogenated chlorofluorocarbons, are R 23, R 32, R 125, R 143a, R 22, R 134a, R 152a, R 124, R 142b, and R 123.
ST refrigerant halogenated hydrocarbon thermodn
IT Thermodynamics
(of halogenated hydrocarbon refrigerants)
IT Refrigeration
(agents, halogenated hydrocarbons, thermodn. properties of)
IT 75-10-5 75-37-6 75-45-6 75-46-7 75-68-3 306-83-2 354-33-6 420-46-2 811-97-2 2837-89-0
RL: USES (Uses)
(refrigerants, thermodn. properties of)

L15 ANSWER 175 OF 175 CAPLUS COPYRIGHT 2008 ACS on STN
AN 1989:636467 CAPLUS
DN 111:236467
OREF 111:39243a,39246a
ED Entered STN: 23 Dec 1989
TI Lubricants for refrigeration compressors
IN McGraw, Philip W.; Ward, Eldon L.
PA Dow Chemical Co., USA
SO U.S., 5 pp.
CODEN: USXXAM
DT Patent

LA English
IC ICM C10M105-34
ICS C10M105-36
INCL 252-52A
CC 51-8 (Fossil Fuels, Derivatives, and Related Products)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 4851144	A	19890725	US 1989-295612	19890110
	JP 02276894	A	19901113	JP 1990-728	19900108
	CA 2007374	A1	19900710	CA 1990-2007374	19900109
	CA 2007374	C	20001010		
	NO 9000089	A	19900711	NO 1990-89	19900109
	EP 378176	A1	19900718	EP 1990-100379	19900109
	EP 378176	B1	19940803		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL				
	AU 9047825	A	19900719	AU 1990-47825	19900109
	AU 630401	B2	19921029		
	CN 1044492	A	19900808	CN 1990-100090	19900109
	BR 9000106	A	19901016	BR 1990-106	19900109
	ES 2057188	T3	19941016	ES 1990-100379	19900109
	KR 157627	B1	19990218	KR 1990-157	19900109
	ZA 9000175	A	19910925	ZA 1990-175	19900110
PRAI	US 1989-295612	A	19890110		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
US 4851144	ICM	C10M105-34
	ICS	C10M105-36
	INCL	252-52A
	IPCI	C10M0105-34 [ICM,4]; C10M0105-36 [ICS,4]; C10M0105-00 [ICS,4,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0111-00 [I,C*]; C10M0111-04 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0020-04 [N,A]; C10N0040-30 [N,A]
	NCL	252/068.000; 252/067.000; 508/485.000; 508/495.000; 508/496.000
	ECLA	C09K005/04B4; C09K005/04B4B; C10M111/04; C10M169/04; C10M171/00R; M10M; M10N; M10N
JP 02276894	IPCI	C10M0111-04 [ICM,5]; C10M0111-04 [ICI,5]; C10M0111-00 [ICI,5,C*]; C10M0107-34 [ICI,5]; C10M0107-00 [ICI,5,C*]; C10M0105-38 [ICI,5]; C10M0105-42 [ICI,5]; C10M0105-36 [ICI,5]; C10M0105-00 [ICI,5,C*]; C10N0020-02 [ICI,5]; C10N0020-04 [ICI,5]; C10N0040-30 [ICI,5]
CA 2007374	IPCI	C10M0145-04 [ICM,5]; C10M0145-00 [ICM,5,C*]; C09K0005-04 [ICS,5]; C09K0005-00 [ICS,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0111-00 [I,C*]; C10M0111-04 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0020-04 [N,A]; C10N0040-30 [N,A]
NO 9000089	IPCI	C10M0111-00 [ICM,5]; C10M0131-02 [ICS,5]; C10M0131-00 [ICS,5,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0111-00 [I,C*]; C10M0111-04 [I,A]; C10M0169-00 [I,C*];

		C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0020-04 [N,A]; C10N0040-30 [N,A]
EP 378176	IPCI	C10M0111-04 [ICM,5]; C09K0005-04 [ICS,5]; C09K0005-00 [ICS,5,C*]; C10M0169-04 [ICS,5]; C10M0111-04 [ICI,5]; C10M0111-00 [ICI,5,C*]; C10M0105-36 [ICI,5]; C10M0105-38 [ICI,5]; C10M0105-62 [ICI,5]; C10M0107-34 [ICI,5]; C10M0169-04 [ICI,5]; C10M0169-00 [ICI,5,C*]; C10M0105-36 [ICI,5]; C10M0105-38 [ICI,5]; C10M0105-62 [ICI,5]; C10M0105-00 [ICI,5,C*]; C10M0107-34 [ICI,5]; C10M0107-00 [ICI,5,C*]; C10M0129-72 [ICI,5]; C10M0129-74 [ICI,5]; C10M0129-00 [ICI,5,C*]; C10M0131-04 [ICI,5]; C10M0131-00 [ICI,5,C*]; C10M0133-08 [ICI,5]; C10M0133-00 [ICI,5,C*]; C10N0040-30 [ICI,5]
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CN 1044492	IPCI	C10M0107-32 [ICM,5]; C10M0107-00 [ICM,5,C*]
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ES 2057188	IPCI	C10M0111-04 [ICM,4]; C09K0005-04 [ICS,4]; C09K0005-00 [ICS,4,C*]; C10M0169-04 [ICS,4]; C10M0111-04 [ICI,4]; C10M0111-00 [ICI,4,C*]; C10M0105-36 [ICI,4]; C10M0105-38 [ICI,4]; C10M0105-62 [ICI,4]; C10M0107-34 [ICI,4]; C10M0169-04 [ICI,4]; C10M0169-00 [ICI,4,C*]; C10M0105-36 [ICI,4]; C10M0105-38 [ICI,4]; C10M0105-62 [ICI,4]; C10M0105-00 [ICI,4,C*]; C10M0107-34 [ICI,4]; C10M0107-00 [ICI,4,C*]; C10M0129-72 [ICI,4]; C10M0129-74 [ICI,4]; C10M0129-00 [ICI,4,C*]; C10M0131-04 [ICI,4]; C10M0131-00 [ICI,4,C*]; C10M0133-08 [ICI,4]; C10M0133-00 [ICI,4,C*]; C10N0040-30 [ICI,5]
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ZA 9000175 IPCI C10M [ICM,5]; C09K [ICS,5]
IPCR C09K0005-00 [I,C*]; C09K0005-04 [I,A]; C10M0111-00 [I,C*]; C10M0111-04 [I,A]; C10M0169-00 [I,C*]; C10M0169-04 [I,A]; C10M0171-00 [I,C*]; C10M0171-00 [I,A]; C10N0020-02 [N,A]; C10N0020-04 [N,A]; C10N0040-30 [N,A]

AB Lubricant base compns. for compression refrigeration are composed of 5-95 weight% of polyether polyol (number average mol. weight 400-5000) and 5-95% of esters made from polyhydric alcs. with alkanoic acids or esters made from alkanedioic acids with alkanols. A refrigeration fluid is made from the base composition with the addition of selected hydrochlorofluorocarbons and hydrofluorocarbons so that the base composition is miscible with the refrigerant in the range of -20° to 65°. The preferred polyether polyol is based on a residue selected from glycerin or ethylenediamine and the ester is a pentaerythritol tetraester of a C7-9-alkanoic acid mixture

ST lubricant refrigeration compressor; polyether polyol lubricant refrigeration compressor; ester polyol lubricant refrigeration compressor; glycerin polyether polyol lubricant refrigeration; ethylenediamine polyether polyol lubricant refrigeration; pentaerythritol tetraester alkanoic acid lubricant refrigeration

IT Esters, uses and miscellaneous
RL: USES (Uses)
(lubricants containing, in refrigerants, for refrigeration compressors)

IT Refrigerating apparatus
(lubricants for, polyether polyols-esters as, in hydrofluorocarbon and hydrochlorofluorocarbon refrigerants)

IT Lubricants
(polyether polyols-esters, in hydrofluorocarbon and hydrochlorofluorocarbon refrigerants, for compressors)

IT Fatty acids, esters
RL: USES (Uses)
(C7-9, tetraesters, with pentaerythritol, lubricants containing polyether polyol and, in refrigerants, for refrigeration compressors)

IT Refrigerating apparatus
(compressors, lubricants for, polyether polyols-esters as, in hydrofluorocarbon and hydrochlorofluorocarbon refrigerants)

IT Polyethers, uses and miscellaneous
RL: USES (Uses)
(hydroxy-containing, lubricants containing esters and, in refrigerants, for refrigeration compressors)

IT 78-16-0
RL: USES (Uses)
(lubricants containing polyether polyol and, in refrigerants, for refrigeration compressors)

IT 25791-96-2 51178-86-0
RL: USES (Uses)
(lubricants containing, in refrigerants, for refrigeration compressors)

IT 75-10-5 75-37-6 75-45-6, R 22 75-46-7, Trifluoromethane 75-68-3 75-88-7, 1-Chloro-2,2,2-trifluoroethane 306-83-2, R 123 354-25-6 354-33-6, Pentafluoroethane 359-35-3, 1,1,2,2-Tetrafluoroethane 420-46-2, 1,1,1-Trifluoroethane 593-53-3, Methyl fluoride 593-70-4, Chlorofluoromethane 811-97-2

```
     , R 134a   1320-41-8, Difluoroethylene   1717-00-6, 1,1-Dichloro-1-
     fluoroethane   2837-89-0, 1-Chloro-1,2,2,2-tetrafluoroethane
     RL: USES (Uses)
        (refrigerant, lubricants in, polyether polyols-esters as, for
        refrigeration compressor)


=> logoff y
COST IN U.S. DOLLARS                             SINCE FILE      TOTAL
                                                      ENTRY    SESSION
FULL ESTIMATED COST                                  604.46     616.70

DISCOUNT AMOUNTS (FOR QUALIFYING ACCOUNTS)       SINCE FILE      TOTAL
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                  searching
 NEWS  7  MAY 30  DGENE, PCTGEN, and USGENE enhanced with new homology
                  sequence search option
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 NEWS 10  JUN 13  USPATFULL and USPAT2 updated with 11-character
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                  reclassification data
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                  organizations
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                  Assistant and BLAST plug-in
 NEWS 16  JUN 30  STN AnaVist enhanced with database content from EPFULL
 NEWS 17  JUL 28  CA/CAplus patent coverage enhanced
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 NEWS 18  JUL 28  EPFULL enhanced with additional legal status
                  information from the epoline Register
 NEWS 19  JUL 28  IFICDB, IFIPAT, and IFIUDB reloaded with enhancements
 NEWS 20  JUL 28  STN Viewer performance improved
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                  page images from 1967-1998
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 NEWS 25  AUG 25  CA/CAplus, CASREACT, and IFI and USPAT databases
                  enhanced for more flexible patent number searching
 NEWS 26  AUG 27  CAS definition of basic patents expanded to ensure
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http://www.cas.org/support/stngen/stndoc/properties.html

=> e r-32cn
E1            9     R,Z/BI
E2            1     R,Z,S1,A2/BI
E3            0 --> R-32CN/BI
E4           55     RA/BI
E5            3     RA1/BI
E6            2     RA1198/BI
E7            1     RA1591/BI
E8            2     RA1609/BI
E9            3     RA2/BI
E10           1     RA2591/BI
E11           2     RA2609/BI
E12           1     RA34/BI

=> e r-32/cn
E1            1     R-30/CN
E2            1     R-30P/CN
E3            0 --> R-32/CN
E4            1     R-3264/CN
E5            1     R-32P/CN
E6            1     R-3420-BUTYL ACRYLATE-HYDROXYPROPYL ACRYLATE-STYRENE COPOLYM
                    ER/CN
E7            1     R-4'-(6-(2,2'-DIHYDROXY-1,1'-BINAPHTHYL))-2,2':6',2''-TERPYR
                    IDINE/CN
E8            1     R-4-CHLORO-A-METHYLBENZYL ALCOHOL/CN
E9            1     R-4-KETOCYCLOPHOSPHAMIDE/CN
E10           1     R-40P/CN
E11           1     R-41/CN
E12           1     R-4112/CN

=> e r32/cn
E1            1     R31449_3 (HUMAN CELL LINE 5HL2-B CLONE R31449)/CN
E2            1     R315CX/CN
E3            0 --> R32/CN
E4            1     R32184_1 (HUMAN CELL LINE 5HL2-B CLONE R32184)/CN
E5            1     R32184_2 (HUMAN CELL LINE 5HL2-B CLONE R32184)/CN
E6            1     R32184_3 (HUMAN CELL LINE 5HL2-B CLONE R32184)/CN
E7            1     R33083_1 (HUMAN CELL LINE 5HL2-B CLONE R33083)/CN
E8            1     R3318/CN
E9            1     R33374_1 (HUMAN CELL LINE 5HL2-B CLONE R33374)/CN
E10           1     R33729_1 (HUMAN CELL LINE 5HL2-B CLONE R33729)/CN
E11           1     R33799_1 (HUMAN CELL LINE 5HL2-B CLONE R33799)/CN
E12           1     R3398/CN

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COST IN U.S. DOLLARS                              SINCE FILE      TOTAL
                                                       ENTRY    SESSION
FULL ESTIMATED COST                                     0.92       1.13

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DICTIONARY FILE UPDATES:   3 SEP 2008  HIGHEST RN 1046204-20-9
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=> file caplus
COST IN U.S. DOLLARS                              SINCE FILE      TOTAL
                                                       ENTRY    SESSION
FULL ESTIMATED COST                                     0.46       1.59

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L1          1 US20070187638/PN

=> d all

L1   ANSWER 1 OF 1  CAPLUS  COPYRIGHT 2008 ACS on STN
AN   2005:258664  CAPLUS
DN   142:299850
ED   Entered STN:  25 Mar 2005
TI   Composition based on hydrofluorocarbons and its use in refrigeration
     and/or air conditioning, and heat transfer system containing it
IN   Guilpain, Gerard; Caron, Laurent
PA   Arkema, Fr.
SO   Fr. Demande, 13 pp.
     CODEN: FRXXBL
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DT Patent
LA French
IC ICM C09K005-04
CC 45-5 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	FR 2860001	A1	20050325	FR 2003-11025	20030919
	FR 2860001	B1	20080215		
	WO 2005028586	A2	20050331	WO 2004-FR2231	20040902
	WO 2005028586	A3	20050630		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	EP 1664234	A2	20060607	EP 2004-787286	20040902

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	CN 1852963	A	20061025	CN 2004-80027155	20040902
	JP 2007505963	T	20070315	JP 2006-526657	20040902
	US 20070187638	A1	20070816	US 2006-570938	20061222 <--
PRAI	FR 2003-11025	A	20030919		
	WO 2004-FR2231	W	20040902		

CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
FR 2860001	ICM	C09K005-04
	IPCI	C09K0005-00 [I,C]; C09K0005-04 [I,A]
	IPCR	C09K0005-00 [I,C]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
WO 2005028586	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
EP 1664234	IPCI	C09K0005-04 [ICM,7]; C09K0005-00 [ICM,7,C*]
	IPCR	C09K0005-00 [I,C*]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
CN 1852963	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]
	IPCR	C09K0005-00 [I,C]; C09K0005-04 [I,A]
	ECLA	C09K005/04B4B
JP 2007505963	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]; F25B0001-00 [I,A]
	IPCR	C09K0005-00 [I,C]; C09K0005-04 [I,A]; F25B0001-00 [I,C]; F25B0001-00 [I,A]
US 20070187638	IPCI	C09K0005-04 [I,A]; C09K0005-00 [I,C*]
	NCL	252/067.000

AB The composition comprises R-32 (difluoromethane) 1-50, R-125 (pentafluoroethane) 10-90, R-134a (1,1,1,2-tetrafluoroethane) 1-50, and R-143a (1,1,1-trifluoroethane) 5-20%.

ST refrigeration air conditioning hydrofluorocarbon compn; heat transfer system hydrofluorocarbon compn; difluoromethane pentafluoroethane tetrafluoroethane trifluoroethane refrigeration compn

IT Air conditioning
Heat exchangers
Refrigerants
Refrigerating apparatus

```
     Refrigeration
        (composition based on hydrofluorocarbons and its use in refrigeration and/or
        air conditioning, and heat transfer system containing it)
IT   Hydrocarbons, uses
     RL: TEM (Technical or engineered material use); USES (Uses)
        (fluoro; composition based on hydrofluorocarbons and its use in
        refrigeration and/or air conditioning, and heat transfer system containing
        it)
IT   75-10-5, R-32   354-33-6, R-125   420-46-2, R-143a   811-97-2, R-134a
     RL: TEM (Technical or engineered material use); USES (Uses)
        (composition based on hydrofluorocarbons and its use in refrigeration and/or
        air conditioning, and heat transfer system containing it)
IT   74-98-6, Propane, uses   75-00-3, Ethyl chloride   75-28-5, Isobutane
     106-97-8, Butane, uses   115-07-1, Propylene, uses   115-10-6, Dimethyl
     ether   124-38-9, Carbon dioxide, uses   156-60-5, trans-1,2-
     Dichloroethylene
     RL: NUU (Other use, unclassified); USES (Uses)
        (rinsing solution; composition based on hydrofluorocarbons and its use in
        refrigeration and/or air conditioning, and heat transfer system containing
        it)
RE.CNT  7     THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
```


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(1) Allied Signal Inc; WO 9411459 A 1994 CAPLUS
(2) Anon; PATENT ABSTRACTS OF JAPAN 1996, V1996(08)
(3) Asahi Glass Co Ltd; JP 08100170 A 1996 CAPLUS
(4) Asahi Glass Co Ltd; JP 8100170 A 1996
(5) Bkt Bonnet Kaeltetechnik Gmbh; EP 1072850 A 2001
(6) Daikin Ind Ltd; EP 0979855 A 2000 CAPLUS
(7) Ici Plc; EP 0536940 A 1993 CAPLUS
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COST IN U.S. DOLLARS                             SINCE FILE      TOTAL
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FULL ESTIMATED COST                                    6.83       8.42

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STRUCTURE FILE UPDATES:    3 SEP 2008  HIGHEST RN 1046204-20-9
DICTIONARY FILE UPDATES:   3 SEP 2008  HIGHEST RN 1046204-20-9

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TSCA INFORMATION NOW CURRENT THROUGH July 5, 2008.

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REGISTRY includes numerically searchable data for experimental and
predicted properties as well as tags indicating availability of
experimental property data in the original document.  For information
on property searching in REGISTRY, refer to:
```

http://www.cas.org/support/stngen/stndoc/properties.html

```
              1 75-10-5/RN
              1 354-33-6/RN
              1 420-46-2/RN
              1 811-97-2/RN
L2            4 75-10-5/RN OR 354-33-6/RN OR 420-46-2/RN OR 811-97-2/RN

=> d 1-4

L2   ANSWER 1 OF 4  REGISTRY  COPYRIGHT 2008 ACS on STN
RN   811-97-2  REGISTRY
ED   Entered STN:  16 Nov 1984
CN   Ethane, 1,1,1,2-tetrafluoro-  (CA INDEX NAME)
OTHER NAMES:
CN   1,1,1,2-Tetrafluoroethane
CN   1,2,2,2-Tetrafluoroethane
CN   AK 134a
CN   Arcton 134a
CN   Ecolo Ace 134a
CN   F 134A
CN   FC 134a
CN   Forane 134a
CN   Freon 134a
CN   Fron 134a
CN   Genetron 134a
CN   Halon 134A
CN   HC 134a
CN   HCFC 134a
CN   HFA 134
CN   HFA 134a
CN   HFA P134a
CN   HFC 134a
CN   Khladon 134a
CN   KLEA 134a
CN   Meforex 134a
CN   Norflurane
CN   P 134A
CN   R 134a
CN   Refrigerant R 134a
CN   RF 134a
CN   Solkane 134a
CN   SUVA 134a
CN   TG 134a
MF   C2 H2 F4
CI   COM
LC   STN Files:   ADISNEWS, AGRICOLA, ANABSTR, BEILSTEIN*, BIOSIS, BIOTECHNO,
       CA, CAOLD, CAPLUS, CASREACT, CBNB, CHEMCATS, CHEMINFORMRX, CHEMLIST,
       CHEMSAFE, CIN, CSCHEM, CSNB, DDFU, DETHERM*, DRUGU, EMBASE, ENCOMPLIT,
       ENCOMPLIT2, ENCOMPPAT, ENCOMPPAT2, GMELIN*, HSDB*, IFICDB, IFIPAT,
       IFIUDB, IPA, MEDLINE, MRCK*, MSDS-OHS, PIRA, PROMT, RTECS*, SPECINFO,
       TOXCENTER, ULIDAT, USAN, USPAT2, USPATFULL, USPATOLD
         (*File contains numerically searchable property data)
     Other Sources:   DSL**, EINECS**, TSCA**, WHO
         (**Enter CHEMLIST File for up-to-date regulatory information)
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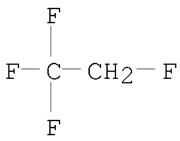
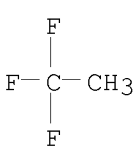


PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

5826 REFERENCES IN FILE CA (1907 TO DATE)
17 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
5875 REFERENCES IN FILE CAPLUS (1907 TO DATE)
19 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

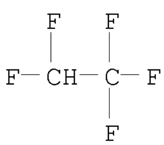
L2 ANSWER 2 OF 4 REGISTRY COPYRIGHT 2008 ACS on STN
RN 420-46-2 REGISTRY
ED Entered STN: 16 Nov 1984
CN Ethane, 1,1,1-trifluoro- (CA INDEX NAME)
OTHER NAMES:
CN 1,1,1-Trifluoroethane
CN CFC 143A
CN F 143A
CN FC 143a
CN Freon 143a
CN Fron 143a
CN HCF 143a
CN HCFC 143a
CN HFA 143a
CN HFC 143a
CN Methylfluoroform
CN R 143a
CN TG 143a
MF C2 H3 F3
CI COM
LC STN Files: AGRICOLA, ANABSTR, BEILSTEIN*, BIOSIS, CA, CAOLD, CAPLUS, CASREACT, CBNB, CHEMCATS, CHEMINFORMRX, CHEMLIST, CIN, CSCHEM, CSNB, DETHERM*, GMELIN*, IFICDB, IFIPAT, IFIUDB, MEDLINE, MSDS-OHS, PROMT, RTECS*, SPECINFO, TOXCENTER, ULIDAT, USPAT2, USPATFULL, USPATOLD
(*File contains numerically searchable property data)
Other Sources: EINECS**, TSCA**
(**Enter CHEMLIST File for up-to-date regulatory information)



PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

1611 REFERENCES IN FILE CA (1907 TO DATE)
6 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
1615 REFERENCES IN FILE CAPLUS (1907 TO DATE)
83 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L2   ANSWER 3 OF 4 REGISTRY COPYRIGHT 2008 ACS on STN
RN   354-33-6 REGISTRY
ED   Entered STN: 16 Nov 1984
CN   Ethane, 1,1,1,2,2-pentafluoro- (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN   Ethane, pentafluoro- (6CI, 7CI, 8CI, 9CI)
OTHER NAMES:
CN   1,1,1,2,2-Pentafluoroethane
CN   1,1,2,2,2-Pentafluoroethane
CN   Ecolo Ace 125
CN   F 125
CN   FC 125
CN   Freon 125
CN   Fron 125
CN   HCFC 125
CN   HFA 125
CN   HFC 125
CN   Khladon 125
CN   Pentafluoroethane
CN   R 125
MF   C2 H F5
CI   COM
LC   STN Files: AGRICOLA, ANABSTR, BEILSTEIN*, BIOSIS, CA, CAOLD, CAPLUS, CASREACT, CBNB, CHEMCATS, CHEMINFORMRX, CHEMLIST, CIN, CSCHEM, CSNB, DETHERM*, GMELIN*, HSDB*, IFICDB, IFIPAT, IFIUDB, MEDLINE, MSDS-OHS, PIRA, PROMT, RTECS*, SPECINFO, TOXCENTER, ULIDAT, USPAT2, USPATFULL, USPATOLD
(*File contains numerically searchable property data)
Other Sources: EINECS**, TSCA**
(**Enter CHEMLIST File for up-to-date regulatory information)



PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT

2270 REFERENCES IN FILE CA (1907 TO DATE)
6 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
2281 REFERENCES IN FILE CAPLUS (1907 TO DATE)
40 REFERENCES IN FILE CAOLD (PRIOR TO 1967)

L2   ANSWER 4 OF 4 REGISTRY COPYRIGHT 2008 ACS on STN
RN   75-10-5 REGISTRY
ED   Entered STN: 16 Nov 1984
CN   Methane, difluoro- (CA INDEX NAME)
OTHER NAMES:
CN   Difluoromethane
CN   Ecolo Ace 32
CN   F 32
CN   FC 32
CN   Freon 32
CN   Genetron 32
CN   HFA 32
CN   HFC 32
CN   Methylene difluoride
CN   R 32

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CN   R 32 (refrigerant)
MF   C H2 F2
CI   COM
LC   STN Files:   AGRICOLA, ANABSTR, BEILSTEIN*, BIOSIS, CA, CAOLD, CAPLUS,
       CASREACT, CBNB, CHEMCATS, CHEMINFORMRX, CHEMLIST, CIN, CSCHEM, CSNB,
       DETHERM*, GMELIN*, IFICDB, IFIPAT, IFIUDB, MEDLINE, MSDS-OHS, PIRA,
       PROMT, RTECS*, SPECINFO, TOXCENTER, ULIDAT, USPAT2, USPATFULL, USPATOLD
         (*File contains numerically searchable property data)
     Other Sources:   EINECS**, NDSL**, TSCA**
         (**Enter CHEMLIST File for up-to-date regulatory information)


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**PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT**

            3912 REFERENCES IN FILE CA (1907 TO DATE)
              14 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
            3919 REFERENCES IN FILE CAPLUS (1907 TO DATE)
             127 REFERENCES IN FILE CAOLD (PRIOR TO 1967)


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                  predefined hit display formats
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                  searching
 NEWS  7  MAY 30  DGENE, PCTGEN, and USGENE enhanced with new homology
                  sequence search option
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 NEWS  9  JUN 06  KOREAPAT updated with 41,000 documents
 NEWS 10  JUN 13  USPATFULL and USPAT2 updated with 11-character
                  patent numbers for U.S. applications
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                  web-based collections
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                  reclassification data
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 NEWS 20  JUL 28  STN Viewer performance improved
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 NEWS 22  AUG 13  CA/CAplus enhanced with printed Chemical Abstracts
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 NEWS 24  AUG 15  CAplus currency for Korean patents enhanced
 NEWS 25  AUG 25  CA/CAplus, CASREACT, and IFI and USPAT databases
                  enhanced for more flexible patent number searching
 NEWS 26  AUG 27  CAS definition of basic patents expanded to ensure
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E2             1     EP1072841/PN
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=> s 1072850
L1             0 1072850

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